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ABSTRACT

The use of six integrated learning systems (ILS) in adult basic education (ABE) programs in British Columbia was analyzed. The systems studied were as follows: Autoskill, Computer Curriculum Corporation (CCC), Jostens (INVEST), Pathfinder, Principle of the Alphabet Literacy System (PALS), and Programmed Logic for Automatic Teaching Operations (PLATO). Three instruments were developed for interviewing instructors and students using the systems as well as some students who were not using an ILS. Twenty sites were visited across the province. Twenty-one instructions and 60 students were interviewed. Generally, the project team felt positive about what they saw and experienced, and the students interviewed seemed enthusiastic about their work with an ILS. None of the systems were found to be perfect, and administrators and instructors were cautioned to determine their needs and the characteristics of the systems carefully before purchasing a system. (Thirty tables provide detailed analysis of student characteristics and responses. Appendixes to the report include the following: guidelines for acquiring computer-based adult literacy systems, analysis of ILS, and interview questionnaires developed for the project. Contains 33 references.) (KC)

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Analysis of Integrated Learning Systems and Their Use in Adult Basic Education Programs in British Columbia

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for the
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Audrey M. Thomas
Victoria
February 1994

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1. INTRODUCTION

Over the last five years or so, computer-based learning systems have been introduced into adult basic education (ABE) programs in all parts of the province of British Columbia. Some of the systems were introduced as pilot projects to the province. Others have been piloted outside British Columbia before being introduced in the province. Systems have been aggressively marketed within the province so that there is now a fairly widespread distribution and a variety of systems throughout British Columbia. However, there has been little analysis of the use of these systems in the province, nor have the users been interviewed to any great depth for their opinions on the systems.

This project was designed to provide an independent descriptive analysis of six of the computer systems in use in ABE programs in the province. The systems are:

- Autoskill
- Computer Curriculum Corporation (CCC)
- Jostens (INVEST)
- Pathfinder
- Principle of the Alphabet Literacy System (PALS)
- Programmed Logic for Automatic Teaching Operations (PLATO)

Collectively, the systems are found in colleges, school district adult learning centres and in a variety of community organizations.

The objectives of the project were to:

1. Complete a literature review of computer assisted learning systems in adult basic education programs;

2. Provide an analysis of the six computer systems (as identified above) in use in the province;

3. Survey the system users in the province and provide an analysis of their application of the systems;

4. Identify courseware available in terms of the ABE framework in the province; and,

5. Develop a framework for decision-making around the use of the six computer systems.

Terminology

Many terms have been used, often interchangeably, to describe the instructional process which is mediated by computers. Such terms include: computer-based learning (CBL), computer-based education (CBE), computer-based instruction (CBI), computer-assisted learning (CAL), computer-managed instruction (CMI), computer-assisted instruction (CAI), integrated learning systems (ILSs), integrated instructional systems (IISs).

CMI and CAI are two terms which have gained acceptance in North America. Friesen (1991) says that CMI is the term "for computer-based learning programs which manage both the learning sequence and related educational and administrative functions, including testing, sequencing of learning activities for individualized learning, and record keeping" (p. 5). CAI has been used generally to describe single disk educational programs and thus pertains to a wide variety of available programs. Sometimes, CAI can be a resource within a CMI program and in this sense would be considered a sub-set of CMI.

Most of the systems under review for this project combine CMI and CAI functions. The extent to which they do so and the relative emphasis on each are distinguishing factors between the systems. This combination of functions has caused researchers and writers to search for new definitions. Some refer to "computer-assisted learning systems" (Fahy, 1991; Sylvestre and Lewis, 1993); others refer to "large" or "comprehensive" computer-assisted instruction systems (Wright, 1993). The use of an initial adjective and the final word systems are meant to convey the impression of something more weighty than the terms CAI or CMI by themselves. Perhaps to get over this difficulty, others use the terms ILSs or IISs.

Sherry (1990) argues that "Integrated Instructional System" (IIS) is a more accurate term than "Integrated Learning System" (ILS). He says that the systems "do not possess the level of learner-adaptiveness and artificial intelligence that education's yet-to-be-developed computer-assisted learning systems will one day possess" (p. 86). He also says that the use of the word "integrated" is a misnomer "since these systems are usually 'integrated' only into themselves" (p. 86). In his view, a truly "integrated system of learning" is not yet a reality. Others are not so fastidious in their use of the terminology. For some, an ILS is a networked computer system which has hundreds of thousands of lessons for students. Inherent in this definition, however, is the management function. Wellburn (1992) cites a more precise definition:

> ILSs are software/hardware systems that offer instructional materials under the umbrella of a management system that monitors and reports on student performance. Most ILSs run on networked computers comprised of a file server and student workstations (p. 5). (Cited from *Electronic Learning*: Special Edition, 1992, p. 13).

In the current project the above definition is accepted while it is hoped that as the technology changes, ILSs will become closer to the ideal envisioned by Sherry. In this report, therefore, the term ILS is used to report on project findings. However, in the literature review, the terms used are those by the authors of the studies under review.

The ABE Framework in British Columbia

At present, funding for ABE in the province comes from two ministries: the Ministry of Education, and the Ministry of Skills, Training and Labour. The former funds school district programs in the province and the latter funds the colleges and institutes. ABE in the college system has been articulated within an overall framework for the last decade and the terms used are well recognized within that system. The school district ABE programs use different terminology.

In this report, the college terminology is used and the school district equivalents have been noted as follows:

• Fundamental ABE (up to Grade 8)	Adult Basic
• Intermediate ABE (Grades 9-10)	Grade 10 Preparation
• Advanced ABE (Grade 11)	Grade 11 Subjects
• Provincial ABE (Grade 12)	Adult Secondary School Completion

Although there is not complete parity of terms, students and instructors know at what levels they are working, so school district respondents were slotted into the college framework terminology for ease of interpretation. The General Educational Development (GED) exam, and the preparation for it, are not part of the College ABE Framework. However, some colleges and some school districts offer the GED. Preparation for the GED is also part of the courseware of several of the ILSs. Therefore, the GED is included in the analysis for this report.

2. PROJECT PROCEDURES

An Advisory Committee representing various educational interests within adult basic education in the province was established to develop the parameters of the project. Two adult educators were contracted to work on the project as a team. They met with the Advisory Committee in June 1993 but did not begin the project until September 1993. Four months were allocated to undertake the substantive work of the project.

The project team met several times to discuss research strategy and to develop survey instruments. Searches for reports and articles on the subject of computer-based learning and on the six ILSs were made. Relevant documents were accumulated for the literature review.

The major focus of the project was to be on the system users and their experience with each of the systems. It was felt, therefore, that site visits and interviews should be conducted on a personal basis rather than by telephone or through questionnaire mailings. In this way, the learning centre set-up would be seen, the atmosphere of the centre noted, and instructors and students actually involved with the six systems would be met.

The six systems have different histories, were developed at different times and places, and offer different approaches to adult basic education curricula. The old analogy can be made about comparing apples to oranges. However, to have a basis for comparative data, and because two people would be involved in the visits and interviews, generic-type interview instruments were developed.

It had been suggested by the Advisory Committee that students who had worked on one of the systems and then moved to another adult program which did not feature the same ILS also be interviewed. Three instruments were therefore developed - one for interviewing instructors; one for students currently using one of the systems; and one for students not currently using one of the systems. A measure of symmetry was aimed for in developing the instruments. Each one had three sections:

A. Background Data
B. Program Description and Experience
C. Using the Computer for Learning (Students)
   Integrated Learning Systems Analysis (Instructors)

Background data was required for identification and profile purposes. This section was quite short. Section B provided descriptive comment and was a mix of closed and open-ended questions aimed at obtaining a picture of the conditions in which the computer system was operating. Section C consisted of a series of statements with a Likert type answering scale (see Appendix C for the instruments). In the development of these instruments, especially Section C, the work of Fahy (1991) was found to be quite useful. After the instruments were developed they were circulated to the Advisory Committee for comment and arrangements were made for a field test.

It was noted that the School District of New Westminster operated two adult learning centres and between them had experience with four of the systems which were to be analyzed. In addition, a new urban native learning centre was about to be opened with another system in place. Thus, in one neighbourhood, five of the six systems were to be found. This appeared, then, to be a good place for the field test and had the advantage of being easily accessible from Victoria where the project was located. The organizational set-up was discussed with the Director of Community Education and instructors, and the interview instruments were used with instructors and students.

After these visits and Advisory Committee input, some minor revisions were made to the instruments. The field test gave a better idea of the length of time required for the interviews and this was helpful in planning subsequent visits. The student's interview took about 20 minutes; and the instructor's interview took about one hour.

Concurrent with the development of the interview instruments, information was obtained on the various systems from the vendors and they were also asked for a list of sites where the systems were in use in the province. The Adult Literacy Contact Centre had also been helpful in providing a list of programs using the different systems. One of the project team was able to attend a correctional education conference where five of the vendors of six of the systems had displays and several of them gave workshops on the use of their systems. Two of the vendors located in the Victoria area met separately with the project team and gave demonstrations of their respective systems.

The six systems are dispersed throughout the province, and some are more numerous than others. **Table 1** shows their distribution as of the Fall, 1993. However, there appeared to be a distinct clustering in the North Central Region (from the Nechako area to Quesnel) with four of the six systems in use, and tentative use of a fifth. There was also a clustering in the Fraser Valley/Lower Mainland and in the Selkirk College region. These areas were marked for visits either because they had multiple systems in use, or they were sites using one of the systems not in common use in the province. Visits were confined mainly to school district and college sites, but one or two community sites were also visited, either to obtain information on systems not as widespread as others, or to get another perspective on a system.

One of the project team had the opportunity to visit several communities in the province in connection with another project. This opportunity was used to contact centres in or near those communities where any of the six systems were in use. Arrangements were made to visit the sites and conduct interviews with instructors and students.

Both team members travelled together and did interviews in the North Central Region, and in the Fraser Valley/Lower Mainland. One team member visited the Selkirk College region and the other visited sites on Vancouver Island. In the end, nineteen sites were visited, exclusive of the field test sites. Attempts were always made to interview the instructor or lab manager (sometimes both), and at least three students. The students were chosen for their willingness to talk to the team members. Some classes had advance warning of the team's arrival and that they wanted to talk to some of the students. Other students, because of the flexible nature of the program did not

Table 1.

Number of Sites in British Columbia as of Fall, 1993[1]

Systems	School Districts[2]	Colleges	Other[3]	Total
Autoskill	4	16	15	35
CCC[4]	13	1	5	19
Jostens	5	6[5]	-	11
Pathfinder	52	1	22	75
PLATO	23	-	16	39
PALS[6]	3	-	-	3
TOTAL	100	24	58	182

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[1] From best information supplied by system representatives.

[2] Many of the institutions or organizations operate more than one site. In many of the school districts, systems are used in the regular K-12 system, so not all sites represent adult programs.

[3] Includes community literacy groups, private institutions, Native friendship centres, non-profit training societies.

[4] CCC sites include networked and stand-alone sites. This may also be true of the other systems except Pathfinder which currently has no stand-alone sites.

[5] Includes Open Learning Agency sites. Some sites are in partnership with other institutions.

[6] No information has been forthcoming from IBM about PALS. The researchers know of its use in 3 school districts.

know in advance, but were asked by their instructor or lab manager if they wanted to speak to the team members. Most were more than willing to do so.

Trying to find students who had worked on a system, but were not currently doing so was rather problematic. The nature of the programming in most of the school districts visited meant that students there were using one of the systems. It was not possible to track past students and have them come for interviews. In four sites, however, three of them colleges, instructors knew of students who had worked on one of the systems and were now enrolled in another program in the institution. They were able to contact these people and set up interview times that did not clash with the student's current timetable. In the fourth site, a school district adult learning centre, students were approached on the day of the visit. In a fifth site, also a school district adult learning centre, students were interviewed who had moved from one system to another. They were interviewed on a dual basis - that is, in relation to the system they had worked on in the past, and then in relation to the system on which they were currently working. All travel and interviews were completed by the end of November. **Table 2** shows the interview spread among the sites for each of the six systems and **Table 3** shows the types of sites visited.

Table 2.

Interviews Conducted For Project

System	Number of Sites Visited	Number of Interviews		
		Instructors	Current Students	Past Students
Autoskill	4	5	9	3
CCC	2	3	6	-
Jostens	3	3	11	2
Pathfinder	8	6	20	4
PLATO	2	3	-	3
PALS	1	1	2[1]	-
TOTAL	20[2]	21	48	12

---

[1] For data analysis purposes, the two PALS students have been excluded. An explanation for this is found on page 19. The number of students in the analysis is 46.

[2] There is overlap between the number of sites and systems - (see Table 3).

Table 3.

Sites Visited According to System

System	College Sites	School District Sites	Other	Total
Autoskill	3	1[1]	-	4
CCC	1	1	-	2
Jostens	2	1	-	3
Pathfinder	-	8(6)[2]	-	8
PLATO	-	1[1]	1	2
PALS	-	1	-	1
TOTAL	6 (5)[2]	13 (8)[2]	1	20 (13)[2]

---

[1] In some school districts, more than one system is used at a site. Sites identified by this superscript also have at least one other system in use.

[2] The number in parentheses shows the actual number of colleges or school districts involved. Some institutions have multiple sites.

3. LITERATURE REVIEW

The 1980s were marked by the introduction of microcomputers and computer-assisted instruction into ABE classrooms in Canada. As the technology improved and prices came down, the rate of introduction increased. The 1990s have seen a proliferation of both computer software and computer learning systems in Canadian programs.

Coping with the new technology has caused many adult educators to question and reflect upon their practice in relation to the underlying principles of adult education. While computer learning systems appear to accommodate some andragogical principles, they seem to be antithetical to others. Friesen (1991) has thrown some of these issues into sharp relief in his master's thesis.

Other adult educators have struggled to formulate some guidelines for practitioners (Computers in Literacy Committee, 1990; Imel, 1988; Turner, 1988). In a previous literature review Thomas (1990) pulled together existing articles and studies on a wide use of computers and computer systems in adult literacy programs. At that time Thomas concluded:

> The extent to which computers are adopted in any adult literacy program will depend on many factors, but in the forefront should be a knowledge of the needs of the program's target population and how they might best be served within the philosophical approach of the program. Researchers stress the integration of computers into the overall curriculum plan or practice. They stress that the computer is a tool, and it alone cannot teach literacy. The human interaction provided by contact with peers and instructors is essential. (p. 31).

In that review, only a few studies had been located which dealt in any way with the systems under review for this current project. In Canada, there was an evaluation of the PALS pilot project (Evans, 1988) and evaluations of the use of PLATO in a pilot project in the Northwest Territories (Fahy, 1988; and Wolter-Mullen, 1989). Two large scale studies in the USA undertook comparisons of different computer-based instruction systems (Swan et al., n.d.; and EPIE, 1990). Both of these were large studies, undertaken with public school populations. The study by Swan et al. was done in academic year 1987/88 in New York City and it looked at the results of thirteen systems in twenty six schools. Four of the six systems considered in this current project were part of the Swan study: Autoskill, CCC, PALS and PLATO. The EPIE study evaluated eight Integrated Instructional Systems (IISs) among which were CCC and Jostens. Sherry (1990) has commented on this study and concludes:

> To rephrase an old cliché, sometimes it's not *what* you use, but *how* you use it that makes the difference. In the context of an IIS, while some systems will be more influential than others, any one of the currently available systems can be effective if used in the right setting, with an appropriate population, and by teachers who are aware of the system's strengths and weaknesses and design their classroom instructional strategies accordingly. (p. 89).

Two other American studies were found that evaluated computer use in adult literacy settings where some of the six systems under review in this study were also present. Turner and Stockdill (1987) report on an "outcomes mosaic" approach to the evaluation of the Technology for Literacy Centre in St. Paul, Minnesota. PLATO and CCC were both used for reading and math by students who were part of this study and gains were made in both subject areas compared to the "control" group.

Seaman and McCallister (1988) evaluated the use of computer systems in a job training literacy services project at two campuses of Houston Community College, Texas. Systems used here included PALS, PLATO and CCC. One campus in the study served participants working at below the 6th grade equivalent, the other campus served participants working from 7th to 12th grade equivalents. Highlights from this study included the following observations:

> ....Students improved both their skills and their efficiency at working with the systems *as they became more experienced* [italics added].
> ....The most effective systems with *lower level* students [italics added] are those that are integrated with traditional teacher/student instruction - they are excellent support systems, but do not replace the need for teacher/student interaction.
> ....Upper level students with stronger skills base are best equipped to work with the systems in self-directed modes.

As would be expected, the PALS system, in conjunction with "intense interaction with the instructor" was found effective at the lower levels and PLATO and CCC effective with upper level students. "Strong, integrated teacher components", however, were still recommended for students at the mid-level of achievement.

Additional comments made by these evaluators stressed that the computer systems should not be a means of increasing the teacher student ratios, rather "student scheduling should be dictated by the educational needs of the participants and not administrative convenience." Also, a call was made for all staff to be trained on each system in use so that they could specifically prescribe appropriate learning activities for students. As a result of their suggested modifications, the researchers anticipated several positive effects on the program:

- teaching staff's role would become more central to the learning program.
- the CAI system activities would become more relevant to the participant.
- the CAI systems would be more integrated into the fabric of the educational program as opposed to added on to the existing program.
  (Extracts from Executive Summary pp. 10-14).

Rachal (1993) reviewed twelve studies of an experimental nature which had been published between 1984 and 1992. The studies examined basic skills such as reading and math or GED level skills among adults. To be included in the review, the study had to have an experimental or quasi-experimental group using CAI during at least part of their instructional time, as well as a control group using non-CAI methods; also, pre- and post-testing had to be done on all groups. Out of 157 citations, only twelve met Rachal's criteria. Six of the twelve were doctoral dissertations. In some of these studies PALS, PLATO and CCC were used along with other software.

Of the twelve studies, six reported no statistically significant differences in achievement between the groups studied. Two studies showed mixed results: in one study there was significant improvement with the CAI group on two tests, but not on a third; in the other study, significant differences favoured the CAI group on one test, but not on another two tests. Another two studies failed to report whether differences in achievement between the groups were significant or not. The remaining two studies of the twelve did report statistically significant differences: one favoured CAI, and the other did not. The study that favoured CAI was based on a 50 minute session of vocabulary instruction. The study that did not favour CAI was conducted with adults reading at or below the third grade level.

Although these results are mixed, the author argues that ten of the twelve studies show that CAI yields results that are at least as good as traditional approaches and that "occasionally" CAI yields significantly greater gains. The studies showed that age was not a factor in achievement generally, but when it was, it tended to favour the older learner. Apparent ancillary benefits for the CAI groups noted in the studies included: improved self-confidence, privacy, self-pacing, immediate feedback, faster learning, and decreases in program attrition rate.

The studies also stressed the importance of teacher support, the need for teacher training, the issue of software selection and development, the need for "care in making investments in expensive technology", the desirability of tying job skills to instruction, and the problem of typing skills for older students.

In his conclusion, Rachal says that the studies show similar patterns to those he reviewed prior to 1984, but feels that it can be argued, based on the experimental literature, that CAI has earned a place in ABE. "But at the same time, expectations of it becoming a miracle cure for the adults in these educational programs are naive and unrealistic." (p. 172).

Recently, there has been a mini-spate of reports on computer systems in use in adult basic education programs in Canada. Three reports have been issued from New Brunswick (Tremblay, 1992; Wilson, 1992; and Department of Advanced Education, 1993). These deal with evaluations of CCC, INVEST (Jostens), and Autoskill respectively. Watkins and Goudie (1991) undertook a comparative study of PLATO and CCC in Labrador Community College. Sylvestre and Lewis (1993) undertook a survey and evaluation of the features of Computer Assisted Learning Systems (CALS) for the Yukon Literacy Coalition. While the focus was on use and needs in the Yukon, the authors gave a cursory summary of the use of CALS across Canada. Alberta Career Development and Employment (1992) also made a comparison of five computer systems - four of which were PLATO, Pathfinder, Jostens, and CCC. Crowley (1994) has produced a set of guidelines to help prospective purchasers of CALS decide which system they should purchase. (See Appendix A.)

The evaluation of the CCC system in New Brunswick was a longitudinal study conducted from May 1991 to April 1992 and involved eight sites in New Brunswick (Tremblay, 1992). Six of the sites had the CCC stand-alone units (SOLOs) and two sites had the CCC networked system (one file server and six work stations). The SOLOs were in Basic Academic Upgrading (BAU) Programs (grades 4 to 6 equivalency) and the networked systems were in Intermediate Academic Upgrading Programs (IAU) (grades 6 to 9 equivalency). The results of the study were:

- Most students using the system showed rates of progress beyond the predictable grade level gain.
- Most instructors felt that skills students learned in the CCC system were being generalized to other contexts.
- The system was appropriate for use in BAU programs, but may have more limited applicability in the IAU programs.
- Student and teacher attitudes toward the system were generally positive.
- The system was used regularly and most sites would like to have more stations.
- More training is required to make the system more effective for use in remediation with students referred from other programs.

The Wilson study (1992) was actually done at a community college in Nova Scotia and its aim was to determine whether a group of adults could make significant gains in academic achievement over eleven weeks of training on the Jostens INVEST program and how such gains would compare to those associated with more traditional learning approaches. At the end of the study it was found that positive gains were made in all areas of reading and mathematics by the INVEST group, but that the extent of the gains in mathematics was greater than those found for the traditional teaching approaches and was especially evident in the area of Problem-Solving. Other findings were that the participants overwhelmingly supported the program, its continuation, and its availability to other potential users. There was also some evidence that improved attitudes to learning as well as generalization of those attitudes to subsequent upgrading programs occurred. The researcher, however, stressed that INVEST was a teaching tool and that the instructor must be more than a "manager" of the system. In this program, many students (80 percent) wanted to spend more time with the instructor. One recommendation from the study was that the instructor spend more time in group-related instruction and be more involved in small group and one-on-one assistance to students.

The Autoskill study (Department of Advanced Education and Labour, 1993) was to determine the value of Autoskill CAL software in teaching young adults (15 to 23 years) in the Adult Learning Centre in Saint John. The average age was 20.83 years and students were working at the Basic Academic Upgrading level. There was no control group. Students worked on the Reading program and the Mathematics program for 30 minutes each a day for over a fifteen week period. The results showed that predicted gains of one to two grade levels did not materialize according to pre- and post-tests using the Canadian Adult Achievement Test (CAAT).

The Reading program was generally not well received by students, but may have a role as a tool for those with certain reading difficulties. The Mathematics program was more favourably received, and there were positive gains in mathematics, although they were not statistically significant. An interesting footnote to this study is that Autoskill was introduced to a centre which already had a CCC SOLO in use. This was in use during the Autoskill study. Students and staff volunteered that they preferred the CCC system on many counts.

Watkins and Goudie (1991) in their study of the use of PLATO and CCC confirmed what other researchers have found that students value and enjoy computer based education as a learning tool. The study produced qualitative and quantitative data after sixteen weeks. The researchers concluded that "both systems have strengths and weaknesses and complement each other well". They felt CCC offered excellent support from beginning levels through to Grade 9 in literacy and numeracy and complemented their ABE program at Levels I and II. PLATO provided excellent support from Grades 4 to 12 in reading, math and science and was closely aligned to the ABE program. Although both systems were very user friendly according to students, the CCC system "seems to offer the instructor more detailed information on the student's progress and a prepared curriculum that is easily tailored to the individual needs of the student" (p. 34).

In British Columbia, several reports emanated from the Standing Committee on Educational Technology (SCOET) (Bizzocchi et al., 1991; Hammond-Kaarremaa, 1992; and SCOET, 1993). These reports address much broader and far-reaching issues than are being examined by the current study but point to the future. A report by Wellburn (1992), dealt with issues related to Integrated Learning Systems in the public schools. There is an extensive bibliography and substantial quoting from selected reports which provide thought-provoking material. In her report, Wellburn states:

> Educators about to make decisions regarding ILSs, will be greatly assisted by having:
>
> - an understanding of how different educational philosophies and theories can be imbedded in learning resources
> - an awareness of the impact of technology on both teachers and students (this includes an awareness of the process of personal change that is required to adapt to a new system)
> - a high level of confidence that staff members have the ability to modify and use many types of resources to best suit specific needs (thus reducing the need for a 'perfect' off-the-shelf solution). (p. 22-23).

Rivers & Associates (1992), had a short section on computer services and resources in their report. Their results showed the predominance of the Pathfinder Computer Managed Instruction (CMI) System in the province and in the school districts. Sylvestre and Lewis (1993) in their report virtually ignore the school districts in British Columbia. This is where most of the computer learning systems are established, and Pathfinder dominates in terms of numbers (see Table 1). Friesen (1991) examines Pathfinder as an example of a CMI system and its fit with the generally accepted principles of adult education. It must be said, however, that most of those principles have been enunciated and developed before the general pervasiveness of the new technology. The advent of that technology challenges adult practitioners to think about their principles and philosophy of learning and where, how, and if the technology can fit. Strong adult educators can build a sense of community and use technology to enhance that sense of community. Technology is the tool of instruction, not the master. It is nothing without human interaction. Mindful of this fact, the current project undertook to talk to instructors, and students who had used or were using the six identified systems. Few, if any of the studies reviewed have actually done that to any great degree. The project team was not interested in achievement gains and control groups, but rather in seeing how the technology was being used and what the experience of users was.

For readers who are not familiar with the main features of each of the ILSs under review, a brief description is provided in Appendix B.

4. ANALYSIS OF SYSTEM USERS AND APPLICATIONS

THE CENTRES

An Impressionistic Overview

It is clearly evident from **Tables 1** and **3** that most of the ILSs are currently employed in school districts. The usual place to find the ILS is in an Adult Learning Centre. These centres vary according to the space and resources available. What happens in the centres and how they are used depends on both the vision of the continuing education directors and the staff employed. The project team members were welcomed into centres in a variety of settings. Many centres were storefronts. One was on the main street of town and occupied the site of a former pool hall and pharmacy. Another was located in a former restaurant adjacent to a motel. Some were located in shopping malls or plazas. One was in a former bank building downtown. Some centres occupied other spaces that had been converted to adult use - a designated room in a community school, a hut on aboriginal reserve land, a room in an elementary school, a former RCMP office above the town post office. Some sites had a designated room in an adult education centre which occupied a former elementary school. Another site was an "add-on" to an existing secondary school. In college campuses, a designated room was the computer lab or the computers were part of the ABE classroom.

The centres varied in shape, size and layout and general attractiveness. Some centres immediately exuded a feeling of warmth and committed purpose, others appeared a little short on "personality". Only in a very few places were computers arranged around the room with students facing the walls and their backs to each other. Most had striven to group the computers in such a way so that they were clustered in one part of the room and the balance of the space was used for break-out activities. It was quite common to see the computers back-to-back so that students could see over or around them.

In the Pathfinder Labs, centres had to have space for the library of materials that accompanies this system, as well as any other learning resource materials instructors and students might need. One centre, with a lot of space in an open-plan setting had a special area set aside for writing tests. Tables and chairs were often strategically placed to suggest group activity or easy interaction with other students. Some centres which had limited lab space often had the use of other rooms to which students could go to do assignments and other tasks which did not require the computer. Some centres with a large open space made creative use of screens and plants to break up the space into different areas. Nearly all centres had a coffee pot within easy access.

In some centres students are specifically sponsored to attend and have to put in twenty-five hours or so a week. In these labs, the work stations were more or less in constant use. Other centres cater to a wider clientele that choose their hours of attendance when it is convenient for them. The flow of people in and out of these centres is less predictable. In the majority of cases, however, centres are open five days a week and many are open four or five nights a week as well.

Programs Offered

In the sites visited, a range of program operations and offerings were encountered. Some sites were small and specifically dedicated to the use of a particular ILS in accord with the sponsoring agencies' wishes. The best examples of this type of site were the community PLATO site, and two of the Jostens sites.

The PLATO program offers Job Search, Life Skills and academic brush-up over a twelve week course which operates Monday to Friday from 9 am to 4 pm. The program can handle a maximum of sixteen adults at a time. There are four group intakes during the year with one week preparation time between each session. It seems that this is the way PLATO is generally being used with adults in British Columbia, that is, by community non-profit societies that have been set up to offer employment preparation courses through a sponsoring agency. In the one school district where PLATO was being used in conjunction with another ILS (Pathfinder), PLATO had originally come in through a similar route and later the program joined forces with the school district.

Jostens is the 'new kid on the block' and has gained a toehold in several communities. Its INVEST program provides basic academic upgrading to about a grade 10 level. In the two centres visited where INVEST had been installed by sponsoring agencies, the programs were geared to GED preparation or grade 10 equivalency - in one centre, with a view to going on to employment; in the other, there was the option of continuing with grade 11 and 12 subjects in the Pathfinder Lab. Both Jostens centres were open Monday to Friday and during the evenings. One centre was also open on Saturdays. Students generally have to attend 25 hours a week. Both centres have continuous intake.

The Native Learning Centre was operating under a complicated set of sponsorships and partnerships. The Pathfinder Lab was open from 9 am to 9 pm Mondays to Thursdays and Fridays from 9 am to 3 pm. Two other school district sites currently had federal government funds sponsoring the computer assisted program within the wider range of adult education offerings. One of these was for Pathfinder and the other for Autoskill.

The PALS lab is unique. The only continuing use of PALS found was in the Saanich School District (#63) which was the original pilot program for Canada. It was set up in the 1987-88 academic year and thoroughly evaluated by a team from the University of Victoria (Evans et al., 1988). One of the evaluation team members is now the lab manager. Although the lab is called the PALS Lab, this is something of a misnomer. The lab is really a learning centre for computer-assisted instruction which is open to children from the regular school system who may need some extra assistance in learning and for adults who want to improve their literacy skills. Children are bussed in during the day, and may come after school hours. Adults may come any time the lab is open. It is open Monday to Thursday from 11 am to 6 pm.

The lab has three Infowindows currently in use for PALS per se and nine personal computers for word-processing and for other CAI programs up to a grade 9 level. On the day of the visit, 2 adult students were present. One had been coming for nearly four years, but clearly had not been working on PALS per se all that time. Because of the small sample and because the experience with other CAI programs were influencing the respondents, PALS was not included in the main part of the analysis of this report.

Two other sites visited have had PALS in the past, but either have abandoned it or have just kept one machine dedicated to it in case someone should want to use it. When it has been used, it seems to have been by students with ESL needs. Its phonetic approach, along with the visual mouth positions for the formation of sounds and emphasis on spelling may be useful for learners whose first language is not English. General feelings seemed to be that ABE students did not like the story used in PALS, nor the approach, and that it was at too basic a level for the needs of most students. There is the added concern that the particular laserdisc technology used by PALS is cumbersome and obsolete. Evidently PALS is now available for home computers on CD-ROM.

Apart from the special cases mentioned above, most of the sites operated within the overall mandate of their institutions and offered a range of programs. In the colleges, Autoskill and CCC were being used as supplements to class or group work at relevant levels. People who wanted or needed extra help on the computer could usually have it arranged.

In two of the school districts visited, the Pathfinder labs were used by alternate school students (usually youths-at-risk of dropping out) at specified times and by adults at other times. In three of the school districts visited, Pathfinder had been installed for upper levels but another ILS was in use for the lower levels - Autoskill, Jostens, or PLATO. Some centres also had a CCC stand alone unit (SOLO) to provide an additional CAI resource and act as a supplement to the main BC curriculum. In one large adult learning centre, the computer lab is the core of the self-paced program, but all sorts of courses are offered in the traditional way in other parts of the centre. Some of the sites visited, in addition to having their computer labs and a range of academic subjects, also offered volunteer tutoring on a one-to-one basis, ESL and help with correspondence courses.

Typical hours of opening for larger centres were from 8 or 9 am to 9 pm or 9:30 pm, Monday to Thursday and an earlier closing on Friday - around 3 or 4 pm. The Centre in Vancouver, however, stays open on Friday evenings and is open from 8 am to 3 pm on Saturdays. Smaller centres may be open only for two or three nights a week.

INSTRUCTORS' INTERVIEW RESPONSES

Educational Philosophy or Mission of Sites

When asked what the educational philosophy or mission of the site or program was, most instructors interviewed answered in terms of their students' needs. Two college instructors gave the college's overall educational mission and one school district person gave the site's raison d'être - high school completion. The community program which had been set up by sponsors' funds to get unemployment insurance (UI) and social assistance recipients back into the workforce had a mission which said exactly that.

For the most part, instructors answered the question in student terms. Some examples are:

> "Take students from where they are, to some place useful. Teach them what they need to know to help them get there."
> "I want learners to learn how to learn and build their self-esteem."
> "Individual progress based on students' needs."
> "Provide a flexible atmosphere and promote student success."
> "Enable students to meet with success in their life, not just in academics."
> "To help students with their reading and writing, and help them experience the joy of learning."
> "Give every opportunity to adult students to make sure they are successful."

In the Native Learning Centre visited, the goals were "to meet the educational, cultural and life skills needs of the community"; and to "prepare the community for the ever advancing work force."

Although these statements are all primarily from computer lab situations, it is interesting to note that there is no mention whatsoever of the technology!

The Instructors

Of the 21 instructors interviewed, 16 were women and 5 were men. Five of the women and one of the men were in the 26 to 40 years age group, the remainder were in the 42 to 55 years age group.

Of the eight college people interviewed, seven were female and one was male. Two of the women were in the younger age group (26 to 40 years), the others were in the 41 to 55 years age group. This latter group, as may be expected, had many years of working experience. Four people had previous experience in Alberta and one in Saskatchewan prior to coming to British Columbia. The collective experience ranged from teaching kindergarten to university programs. Apart from the Jostens site at Douglas College's Lincoln Centre which opened in April 1993, all instructors had several years of experience with their current employers. The ILSs had thus been introduced into the classrooms or settings of experienced adult instructors.

Of the 12 school district people interviewed, 8 were female and 4 were male. One of the men and two of the women were in the 26 to 40 years age group. These younger instructors had come into adult education in two different ways: one had been a volunteer literacy tutor of adults in Ontario and BC; the others had taught in junior high schools before moving to their present positions. The older group, again, collectively had a rich experience in education ranging from elementary school through college and university; in addition, several had worked in related areas - counselling, government adult education department, work with Canada Employment. Three mentioned work with the post-secondary system in Alberta and one had worked in the Northwest Territories. Four said they had Masters' degrees and one had her doctorate. Some of the instructors had worked with their present employer for as many as fifteen years. The most recent newcomer had been on the job since September 1993.

In the PLATO community program, the current Manager of the project was also a part-time instructor and had previous training and experience in social work. In two of the sites we visited, one college, one school district, former ABE students with an aptitude for computers were employed in the computer labs, in one case as the Manager, in the other as an aide with considerable responsibility.

Systems in Relation to ABE Framework

The five instructors using Autoskill worked at the Fundamental ABE level, although one site said they used it into Intermediate ABE. PALS was also used at the Fundamental level. CCC was used from Fundamental through Advanced ABE levels and for GED. Two centres used Jostens specifically for GED preparation, or Grade 10 equivalency. One centre (a college) used Jostens at the Fundamental and Intermediate levels. PLATO was used specifically for GED preparation in the non-profit group and for Fundamental ABE through to Advanced level in the school district program.

Instructors working with Pathfinder used it for all levels in five of the cases interviewed, while one centre used it more specifically for grade 11 and 12 subjects. It should be noted that Pathfinder users have modified the original generic Canadian curriculum to suit the BC requirements for upper level courses required for graduation. A consortium of school districts has pooled resources to undertake this kind of curriculum development. Some instructors or school districts with the necessary expertise have developed their own grade 11 and 12 course outlines for use on Pathfinder. When instructors say it is used at "all levels", this often means the original Pathfinder plus the modifications that have been made to accommodate the higher level curriculum for BC graduation.

Computer Literacy of Instructors

In answer to the question "Would you describe yourself as computer literate?" the college interviewees appeared more guarded than the school district interviewees. Only four of the eight answered "Yes" to the question. The other four gave answers such as "computer comfortable - working on it" "somewhat" (twice) and "yes - barely". Nine of the school district people answered "yes" to this question, two said "Yes, but not in programming.", and one, surprisingly, in the younger age group said "No". The community person replied "Yes" to this question. The two who answered "Yes, but not in programming" were working with Pathfinder and aware of the modifications being done by others with this system. They knew what they wanted the system to do, but relied on others with more computer expertise to actually do it.

Twelve of the instructors had no previous experience with other ILSs. Six had experience with another system with their current employers and three had experience with another system in Alberta. Of the nine with experience with another system, three had experience with PALS, four with PLATO, three with Pathfinder and one also had experience with Autoskill.

The average length of experience working with the current ILS among the instructors interviewed was just under two years (23 months). The range varied from 6 weeks to over 4 years.

Table 4.

Length of Experience of Instructors in Working with Current ILS

System (N)	Range in Months	Mean
Autoskill (5)	1.5 - 36	17.3
CCC (3)	26 - 36	32.6
Jostens (3)	8 - 12	10.6
PALS (1)	48	48.0
Pathfinder (6)	6 - 44	24.3
PLATO (3)	24	24.0
OVERALL	1.5 - 48	23.0

Table 4 shows a breakdown of length of experience of instructors in working with their current ILS. The length of time is reflective of when the various systems were introduced into the province. Jostens is the newcomer, the others have been around longer. Although Autoskill has been in the province for over three years, it is only recently that it has expanded considerably - accounting for its fifth position in longevity on the table.

Instructor Training and Introduction of Systems

Training

Some instructors had received their training directly from the vendor's training representatives, others had picked up the essentials from others already trained. The variables were those of timing - when the system was introduced compared to when the instructor started in the program.

Four of the five Autoskill respondents had received a two-day orientation and training session from the BC representative of the system. The other person picked it up through someone else and by herself.

The CCC system users had up to 3 days of initial training and subsequent training with each upgrade. In one case the number of in-service training days was quoted as 8 or 9 (over a 2 year period).

Two of the three Jostens users had at least 3 days of training on site and additional time with the Open Learning Agency (OLA) which is a Jostens user. The third Jostens user spent 5 days in training in Phoenix, Arizona before the pilot was introduced in his community.

The PALS user, as mentioned previously, was part of the team which evaluated the pilot project in Saanich and that is where she gained her training in the system. There appears to be no vendor support for this system.

The Pathfinder users had received the orientation and training provided by the vendors of that system. In three instances the training was quoted as being 5 days or a week, in one instance, 3 days of training on site was mentioned. The other respondents did not mention any time period, but just said they had received the Pathfinder training. At least one of the instructors was also part of the Advanced BC Curriculum Development Team (see mention on page 21 above).

The PLATO users indicated that they had received 3 days of training and one had also had an additional day of training.

Introduction of Systems

Four of the Autoskill instructors said they introduce the system on an individual basis to the students - this is easy to do in a continuous intake situation. In the sponsored class where people started all at once, the typing tutor program was used as an introductory device to the computer and lead in to the program.

In one centre using the CCC system, staff talked up the use of the system among the students, and a system representative came to do more in-service work with staff. Students can sign up to work on the computer for one hour at a time and can use it for 2 hours at a stretch if no one else is waiting. In another centre, students were introduced to the system in small groups.

In the case of Jostens, two sites began with the system. Instructors say the system is easy to use, orientation is done on an individual basis and only takes a few minutes. In another college setting, staff were trained before the system was introduced and students started a new term with the system in place.

Pathfinder was introduced in a variety of ways in the sites currently using it that were visited. In one case, there was one week after the installation when there were no students present. This gave staff time to become more familiar with the system to "play" with it and do some advance organization. After the first week, 6 students entered the program and were introduced to the system. Enrollments gradually increased after that initial intake.

In the Native Learning Centre, several people from the community took the training and became instructional assistants in the lab. Students who were going to be involved in the academic upgrading program with Pathfinder took a life skills course first to prepare them for reentry. In another small learning centre, students were enrolled one at a time for orientation to the new system. For one instructor, Pathfinder training and experience preceded the setting up of the learning centre in which she was working. In another centre, the instructor "inched into" using the system with the students. It is now fully operational except for English. Only one instructor of those interviewed said she was hired at the time of the arrival of the system and it was indoctrination "by fire". However, there was a month's leeway between her introduction and the arrival of the first students. For the first pilot program, there were 16 students. Students were given an orientation to the system, shown how it worked, and told how to find answers and ask questions. Subsequent students are given an hour's orientation on intake.

The PLATO users said it was a user-friendly system and easy to introduce. The community program does the training of new staff and students as they come into the program. They offer a 45 minute training session.

Instructional Assistants

Whether instructional assistants are needed or not depends on several factors - the number of students enrolled, the scheduling of centre hours, the existing instructor/student ratios, and the demands of the system itself. For instance, of the 5 Autoskill instructors, only one categorically said they did not need an assistant, but this program had 2 full-time instructors for 13 full-time students. In the oral reading strand of Autoskill someone has to be with the student to hear what the student is saying. It is very time-consuming for a classroom instructor to do this. In the absence of an instructional assistant, there appear to be two options open - suppress the oral reading strand; use volunteer tutors to come and listen and work with the students. Three of the Autoskill instructors do use tutors, and 3 answered "yes" to the question about needing an instructional assistant; the other instructor replied "no", but said tutors are used if someone wanted to do the oral reading.

The CCC users said "yes", an instructional assistant was necessary. In one setting there is an instructional assistant who, in effect, is the lab manager. Her office is in the lab and she is available to help students who have difficulty with the computer. At other times, ABE classes come into the lab with their instructors who are able to supervise and give help to students. The instructional assistant helps during the "drop-in" times and has other duties such as doing intakes and assessments. In another CCC setting, there is a team of 6 "proctors" whose first duty is to help those students on the computer. As the centre is open very extended hours and Saturdays, the proctors work at different times to cover these hours. The certified teachers draw up the learning plans for students, the proctors help them with their work and the computer components. There is a team leader who is responsible for the running of the lab.

The Jostens users said they did not need instructional assistants. The ratios of staff to students seemed adequate. Also, the numbers in these sites seem to be regulated somewhat by the number of work stations and the number of full-time sponsored clientele. In one setting which is open at night and only has one full-time instructor, a tutor is available for the evenings when the instructor is not on duty.

The PALS Lab uses an instructional assistant to help students on a one-on-one basis, but the use of this lab is a little different as explained previously. The 12 work stations are used by children and adults requiring help and they use a variety of software programs.

The community PLATO program has adequate staffing for the sixteen students they handle at any one time. The school district PLATO program had an instructional assistant who gives additional support and help to students using the program. Her other duties included responsibility for attendance records, enrolling students, management of systems and troubleshooting.

The Pathfinder sites had mixed responses according to the variable factors outlined above. Two sites do not have an assistant, but they are small and apparently have adequate staff. At three other sites the instructors do have instructional assistants. These sites were all quite large and had continuous intake and extended hours. Two of them had 2 assistants, one had 3. One other site visited was also large and had continuous intake, but instructors felt the staffing ratio was adequate. Based on observations and conversations with students, the team members had some doubts about this situation. (Three other Pathfinder sites were visited whose instructors were not included in the interviewing for this project because of design and time limitations. In each of these cases, however, instructional assistants were being used to help students and instructors with the lab work).

Generally speaking, instructional assistants can be and are quite highly qualified with post-secondary education and degrees, but they do not have a teaching credential. Assistants do intake, orientations, mark some work, coach students and help with equipment problems. The qualifications administrators and instructors look for in assistants are interpersonal skills and an aptitude for or experience with computers.

The Students

Students' age ranges and average age as quoted by instructors working with the different systems are shown in **Table 5**.

The age range is so great because of the open door policy of most of the learning centres. The Jostens programs have the smallest range, because the programs visited had sponsored students attending who were of workforce age. These students are usually those who have not completed high school, have lost their jobs and are on UI or other assistance programs. In the PLATO community programs, people who are sponsored are also on assistance. Also, in the Pathfinder sponsored programs, students are receiving UI or other social assistance.

Table 5.

Age of Students Using ILSs

System (N)	Age Range	Average Age
Autoskill (5)	17 - 65	32
CCC (3)	17 - 85	20s
Jostens (3)	18 - 55	30
PALS (1)	20 - 70	-
Pathfinder (6)	16 - 60	30s
PLATO (3)	19 - 70	30

Other programs which are not specifically sponsored by agencies outside the institution have a greater mix of students: those on assistance, but also seasonal and shift workers, as well as regular workers and homemakers. Some people come because they sense or know their job is at risk. Many single moms are returning to school in order to improve their economic prospects. People come from personal interest. Even some high school graduates come in order to take a refresher course in some subject, or an additional subject. Several instructors mentioned they had noticed an increase in the number of male students in their programs as a result of changes in the UI regulations. In one program in Vancouver the clientele is very multicultural - students come from over 30 different countries and many use the computer lab in the adult learning centre. In another community the people were nearly all aboriginal, and several other programs had aboriginal students. Another site mentioned the presence of Mennonite students who had not completed high school.

Criticalness of the System to the Program

Answers to this question varied. In some cases the system is to all intents and purposes synonymous with "the program", so the natural answer would be to say it was essential. This tended to be the case with the sponsored programs where systems were being piloted or paid for by agencies other than the educational institutions. On a more general level, however, because computers encourage individualized learning and self-pacing, centres which operated a self-paced Learning Centre saw the systems as critical to that element of their total program. The systems helped with continuous intake and with extending opportunities to shift workers and seasonal workers which more traditional classroom-based programs cannot always accomplish.

Eight of the instructors felt their systems were absolutely critical to their program for the community they were serving. These included one of the CCC people, the 3 Jostens and 4 of the Pathfinder users. The PLATO users felt the program had found its niche and was used appropriately in their settings. Of the 5 Autoskill users, 2 said they could do without it, one said the math was critical but the language program was supplemental. Another user said it was not critical at this time but she had not used it with enough people to make a judgement. The other user saw it as a valuable alternative resource. Of the systems under review, if PALS is discounted, Autoskill is the system which currently is least comprehensive, so it is used in a supplemental way. The PALS user felt it was necessary to have the program so that low literate adults had a place from which to start building their skills. The other CCC users saw the system as a useful resource and adjunct which they were continually incorporating into courses as they learned more about its possibilities. Two of the other Pathfinder users had interesting responses. One said they depended on it, but could go back to not having it, but it would mean extra work. The other user said that in the beginning Pathfinder was the program, but now they are evolving in the kinds of activities and group work they offer in their centre. So the system has its niche rather than being dominant.

Evaluation of Systems

Of the people interviewed, only the PALS program had been formally evaluated as part of the pilot program experience in 1988 (Evans, 1988). Eleven interviewees said they had done informal evaluations - usually through student surveys - questionnaire, interviews, or through talking with colleagues. Nine other respondents answered "no" to the question on evaluation.

Special Needs Students

In answer to the question as to whether there were any Special Needs Students in their computer program, 15 of the 21 interviewees answered "yes". In another case, the respondent indicated that the computer system and lab were used one half day a week by the Adult Special Education department. One respondent thought the lab could be filled with Special Needs Students.

When asked to explain how the system did or did not support instructors' efforts with these students, the students most often mentioned were the learning disabled. An Autoskill instructor felt the visual strand in the language program helped with letter reversals and decoding; others mentioned the ability to "write" using the keyboard; five respondents mentioned the repetitive or reinforcement capacity of the computer to help students work at their own pace towards mastery.

Parts of CCC, PALS, Jostens and PLATO were cited as helping ESL students gain confidence with English. One of the small centres using Pathfinder had accommodated some persons with cognitive disabilities and hearing impaired students. One of the Jostens programs had a hearing impaired student. He had an interpreter for the lessons with an audio component.

What Instructors Like and Dislike about their Systems

Table 6 summarizes what instructors said they liked most and least about their systems.

Table 6.

System Likes and Dislikes

System (N)	Likes	Dislikes
Autoskill (5)	Language program addresses 3 types of learning. Definite starting point for those with weak reading skills. Math covers all bases. Specific skills worked on at own rate. Does things instructor does not have time to do.	Computer voice is not clear - difficult to get sound. Oral reading requires someone to be there all the time. Latency factor. Math is not user friendly. Limited questions in paragraph reading.
CCC (3)	Interactive nature - immediate feedback. If don't understand, get different tutorial. Supplementary exercises. Adjustment to student's level. Mixed exercises in math. Very good for Fundamental level. Programs constantly updated. User friendliness. Courses can be modified to fit regular curriculum or used for specific individual upgrading. Student records, worksheets.	Not many courses at BC, ABE Advanced level. Lack of Canadian content.
Jostens (3)	Ease of use for students. No bugs. No anxiety. Broad scope of lessons. Strong early fundamental reading/language skills. Tool to help with organizational structure.	Very inflexible. No customizing. American content. Reports don't meet needs.

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System (N)	Likes	Dislikes
PALS (1)	Structured approach - allows for correct spelling and phonetic approach. Mouth formation of sounds.	Technical aspects. Technology dated.
Pathfinder (6)	Management system leaves instructor free to teach - free from marking. Flexibility for students and instructors - able to modify curriculum, customize. Freedom for instructors. Students get right into it - individualized, become independent learners.	Glitches are frustrating. Some small errors in paths and programs. Linear format - not good for English, discussions, testing. Few opportunities to write meaningfully. Lack of interpersonal activity. Don't know where students actually are in the course.
PLATO (3)	Non-threatening, individualized, a new way of learning for disadvantaged adults. Students like mastery aspect. Forces people to interact with curriculum, get addicted - especially math. Ease of use. Good hotline support.	Animated "little man". Difficult at upper level - students led on before they have really mastered material - need more drill and practice. Limitations in adapting curriculum.

Advantages and Disadvantages of Working with ILSs

This question was more generic. The previous question had asked for likes and dislikes about the system with which instructors were currently working. This one asked for advantages and disadvantages in general of ILSs.

Advantages

- Accommodate different students at different levels.
- Allows students to work independently.
- Students get instant feedback.
- Students see their progress.
- Students become more autonomous.
- Students are introduced to computers and some gain computer literacy.
- Students are kept "on task".
- Students' self-esteem increases.
- Good for kinesthetic learners.

- Offers reinforcement - time to concentrate on weak points.
- Flexibility of scheduling.
- Offers privacy and repetition.
- Students work at own pace - computer is patient.
- Places responsibility on student for his/her learning.
- Instructors are facilitators, guides, helpers.
- Consistent method of delivery within a system.
- Students like control.
- Can accommodate more students.

Disadvantages

- Social isolation - limited human interaction.
- Not as much direct contact with instructors as in traditional setting - added some math and English literature classes.
- Need quiet, private space.
- Never quite fits needs of everyone - customizing is never ending.
- Customizing is time-consuming.
- Skips in logic in our system - needs more drill.
- Some students get easily frustrated and don't ask for help. Computer is literal.
- Some systems not comprehensive enough.
- No one program will be successful for everybody.

Advice for Instructors Thinking of Working with an ILS

Below are some of the comments made by instructors currently using an ILS in their program.

- Find out the needs of your student population.
- Review the curriculum and see where in the overall program the ILS can be incorporated. It is not the overall program.
- Clearly understand what the computer system can really accomplish. Try them out beforehand - they all sound the same in the promotional literature.
- Investigate thoroughly before choosing a system. Acquire one for the program so at least some students will benefit.
- Plan in advance, become familiar with the system, "fool around" with it. Experiment with courses.
- Look upon it as a tool. Get as broad a system as possible and one that is easily changed, or on which you can do course development.
- Take training.
- Get a very good training session with hands on practice.
- Help computerphobes to get past their blocks.
- Make computer work count towards term mark to encourage the reluctant.
- Use the computer, enjoy it, but don't let it be the boss.
- Maximize the use of the computer, but remember it is only a tool.

- Use with other resources - mix and match.
- Let it support your program, not be the program.
- Check to see if an instructional assistant will be needed.
- Sites have to purchase large libraries most of which is never used. Tailor the curriculum for specific needs. [Pathfinder user.]
- Have someone available with expertise in a variety of courses to help students at upper levels.
- The systems make a big difference when one has continuous intake and a volume of students.
- Computers do not replace the instructors, they are only a tool which frees the instructor to do more teaching. (Some administrators think computers will "cure" kids.)

Instructors' Responses to ILS Analysis - Overall Results

Fifty statements based on Fahy's outline (1991) were read and interviewees asked to rate their answers on a five-point scale. Scores were tabulated, added and the means worked out for each group of respondents by ILS and for all responses (N=21). As there was only one respondent for PALS, those scores have not been singled out, but have been factored into the overall response means.

Table 7 shows the overall mean scores for the fifty features from interviewees' responses. The lowest mean scores (from 1 to 2) are the most favourable ratings and indicate a high degree of consistency and performance across all or most systems. These low end scores clearly emphasize most of the advantages that are associated with CAI. The mean mid-scores (from 2 to 4) may incorporate quite a variation in scores between systems depending on their particular features and capabilities and respondents' experiences with them. The highest mean scores (from 4 to 5) indicate a high degree of consistency between system respondents on the unfavourable rating end of the scale. This may be due to a lack of a particular feature in the system, or to a situational disadvantage. For example, unfavourable scores were given to statements about the ability to access networks outside the classroom, and the capability to allow students access to the ILS by modem. This does not necessarily mean the systems cannot respond in these ways, but that overall, instructors either could not, or did not use such capabilities if they existed.

Table 7.

ILS Features Ranked by Overall Mean Scores for Twenty One Respondents

Rank	Feature	Overall Mean
Lowest Scores (1.0 to 1.9)		
1	Allows students to learn at different rates	1.1
2	Encourages learning as an individual process	1.2
	Is composed of modules assigned according to student need	1.2
4	Provides instructors with reports on curricula and student progress	1.3
	Allows for electronic bookmarking	1.3

Rank	Feature	Overall Mean
Lowest Scores (1.0 to 1.9)		
6	Requires the active participation of the learner	1.4
	Curricula meets fundamental ABE requirements	1.4
	Offers competency-based curriculum design	1.4
	Provides adequate security	1.4
10	Allows learners to control the time they spend on task	1.5
11	Developer offers helpful toll-free support for its courseware	1.6
12	Is simple for students to use	1.7
13	Hardware is reliable	1.8
14	Software is reliable	1.9
	Is simple for instructors to use	1.9
Mid-scores (a) 2.0 to 2.9)		
16	Courseware/curricula is reliable (free of errors)	2.1
	Provides easy to use tape back-up capability	2.1
18	Curricula meets Intermediate ABE requirements	2.2
	Makes appropriate use, for adults, of graphics, sound, color	2.2
	Developer offered effective initial training	2.2
21	Meets many diverse needs	2.3
	Allows students choice of topics and activities	2.3
23	Relieves instructor and support staff of class management responsibilities	2.4
	Courseware is culturally sensitive	2.4
	Curricula meets GED requirements	2.4
	Provides a variety of instructional strategies	2.4
27	Allows for a variety of student learning styles	2.6
28	Allows instructors to develop customized reports on curricula and student progress	2.7
29	Courseware provides Canadian content	2.9
	Allows instructors to integrate their own curricula with that of the system	2.9
	Developer arranged for good local hardware maintenance support	2.9
Mid-scores (b) 3.0 to 3.9)		
32	Uses off-line materials (textbooks etc.) as essential complements to on-line materials	3.0
	Allows instructors to author curriculum	3.0
34	Offers specialized topics outside the core curricula (computer applications)	3.1
	Uses off-line materials as supplements or reinforcements to on-line materials	3.1
36	Allows instructors to use courseware from other vendors and sources	3.3
	Allows easy integration of other LAN applications with its own program	3.3
38	Developer offers useful ongoing training	3.4
	Offers educational expertise and experience beyond sales and technical to support program design	3.4
40	Curricula meets Advanced ABE (Grade 11) requirements	3.5
41	Developer provides informative newsletters	3.6

Rank	Feature	Overall Mean
Mid-scores (b) 3.0 to 3.9)		
42	Encourages learning as a social process	3.7
43	Curricula meets Provincial ABE/Dogwood requirements	3.9
	Developer offers a viable users group network	3.9
	Developer provides impartial product reviews and performance references for their system	3.9
Highest scores (4.0 to 5.0)		
46	Developer provides helpful company sponsored support activities	4.1
47	Allows easy export of data to other database software applications	4.4
48	Provides access to networks and information outside of classroom	4.5
49	Allows students to easily access the ILS by modem	4.9
50	Provides access to the Internet	5.0

ILSs Fit With ABE Framework

In **Tables 8** and **9** the mean score responses by system are interpreted in the same manner as for **Table** 7. That is, a low score indicates a high level of agreement and consistency of response for that item on the favourable end of the scale; a mid-score may indicate uncertainty or variation in responses; the highest scores indicate a high degree of agreement among respondents on the unfavourable rating end of the scale.

Table 8.

Fit of ILSs with ABE Framework in BC According to Instructors' Mean Score Responses

System (N)	Fundamental/ Basic	Intermediate/ Grade 10 Prep	GED[1]	Advanced/ Grade 11	Provincial/ ASS Comp[2]
Autoskill (5)	1.4	3.5	4.3	4.5	4.5
CCC (3)	1.0	2.7	2.0	3.3	4.7
Jostens (3)	1.3	1.0	1.3	4.5	5.0
PALS (1)	1.0	5.0	5.0	5.0	5.0
Pathfinder (6)	1.8	1.8	1.8	2.6	2.5
PLATO (3)	1.3	1.0	1.3	3.0	3.3

It is obvious that PALS is the only system geared exclusively to the Fundamental level (it addresses the Lower Fundamental or beginning level). Four of the other systems are considered to almost always meet Fundamental requirements: CCC, Jostens, PLATO and Autoskill. Where systems did not gain a perfect "1.0", it is perhaps because instructors felt there were some gaps in the programming level or options offered, or they were not satisfied with the program offerings and did some supplementing. The higher score of 1.8 for Pathfinder is due to the fact that it is not geared to the lowest levels of Fundamental. Students have to be able to read to work on Pathfinder. It "kicks in" at about the middle of Fundamental.

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[1] Although GED is not part of the College ABE Framework, it is used as a component of many of the systems, hence its inclusion.

[2] ASS (Adult Secondary School) Completion .

At the Intermediate level for Autoskill, the higher score indicates users' feelings and experience that the math program fits into Intermediate, but the Reading program does not. The higher scores for the remaining ABE levels for Autoskill also reflect the paucity of programs at these levels at this stage. Jostens and CCC are good up to about grade 10 and GED and then they too peter out in terms of more advanced level subjects.

Pathfinder is the system most suited to the more advanced levels, mainly due to the work of the BC consortium. It is, however, mainly a CMI system. PLATO could also be used at more advanced levels and offers CMI/CAI, but one user did not recommend it for BC grade 11 and 12 subjects because of 'gaps in the system'.

To summarize: PALS is used at Lower Fundamental level; Pathfinder is used at Upper Fundamental and Intermediate levels; Autoskill, CCC, Jostens and PLATO are used throughout the Fundamental and also at Intermediate levels, but Autoskill is the least comprehensive of the systems at the Intermediate level. CCC, Jostens, PLATO and Pathfinder are used for GED. PLATO and CCC have some subjects which may be useful at the Advanced level, but Pathfinder offers most at this level and at the Provincial levels.

The question of "fit" is not just one of levels, however - the range of subjects available and Canadian content are at least two other variables which have to be considered. **Table 9** shows the mean scores given by instructors to Canadian content. Pathfinder, which was made and developed in Canada, has the best score for Canadian content. Jostens has the worst, followed by CCC. CCC users have found it to be a great supplement to other work and say that its content is more generic rather than overtly American. Jostens is American and the system has only recently made inroads into Canada. As their market share increases, they may begin to provide Canadian content or at least try to accommodate Canadian concerns.

Table 9.

Canadian Content in Courseware of ILSs

System (N)	Mean Score of Respondents
Autoskill (5)	2.2
CCC (3)	4.0
Jostens (3)	4.7
Pathfinder (6)	1.8
PLATO (3)	2.7

It is because of the differences in the systems, that many adult learning centres or jurisdictions are combining ILSs: Jostens with Pathfinder; Autoskill with Pathfinder; PLATO with Pathfinder; CCC as an alternative supplement to Pathfinder and so on.

Detailed Analysis of Integrated Learning Systems

Instructors' opinions of the systems they work with are reflected in their answers to the fifty statements given in Part C of the interview. These statements have been broken down and grouped into eleven tables in Appendix B. Interested readers can browse through these tables and form their own opinions. The tables are presented as an aid to help readers see what current users perceive to be the various strengths and weaknesses of the ILS with which they are working. They are indicators only.

The technical features of five of the ILSs, software available and costs are summarized for stand-alone systems, and networked systems in Tables B12 and B13 respectively. Readers should note that conditions are continually changing in the industry and this affects configurations, peripherals and costs, among other things.

RESPONSES OF STUDENTS CURRENTLY WORKING ON ILSs

Student Demographics

This analysis of students' responses is based on 46 interviews with students working on 4 of the systems. **Table 10** shows some of the main features of this population. The reason for excluding PALS has already been mentioned. In the visits it was not possible to interview students currently working on PLATO, but some students who had worked on this system in the recent past were interviewed.

Table 10.

Major Characteristics of Students Currently Working on ILSs

System	Number of Interviewees	Gender		Site	
		Male	Female	College	School District
Autoskill	9	4	5	6	3
CCC	6	2	4	3	3
Jostens	11	5	6	7	4
Pathfinder	20	6	14	-	20
Total	46	17	29	16	30

Of those interviewed, 63% were female and 65% were attending school district programs.

Table 11.

Age of Students Working on ILSs by System and Gender

System (N)	Age Group in Years					
	18 - 25		26 - 40		41 - 55	
	M	F	M	F	M	F
Autoskill (9)	1	3	3	-	-	2
CCC (6)	1	-	1	3	-	1
Jostens (11)	1	1	3	2	1	3
Pathfinder (20)	1[1]	3	3	10	2	1
Total (46)	4	7	10	15	3	7

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[1] The person in this age group was actually 15 years old. He was attending an evening alternate school program in the same lab as the adults.

Table 11 shows the ages of the students interviewed by system and gender. Of those interviewed, 57% were in the 26 to 40 years age group, 24% were in the 18 to 25 years age group and 22% were in the 41 to 55 years age group. None of the students interviewed were in the over 55 years age group.

Table 12.

Levels at which Student Interviewees were Working by System

System (N)	Fundamental	Intermediate	GED	Advanced/ Grade 11	Provincial/ Grade 12	Mixed 11 & 12
Autoskill (9)	8	1[1]	-	-	-	-
CCC (6)	-	2[2]	-	4[3]	-	-
Jostens (11)	3	5	3	-	-	-
Pathfinder (20)	1	-	-	9	6	4
Total (46)	12	8	3	13	6	4

Although the samples are small, **Table 12** backs up the descriptions of how the systems fit with the ABE framework in BC which was discussed in the instructors' analysis of the systems in the pages above (pp. 33-34).

Length of Time Spent Working on the Computer

The average length of time spent working on the ILS for all 46 students was nearly 29 weeks. The shortest time was one week by a new registrant in a Pathfinder centre and the longest time was over 2 years, also in a Pathfinder centre. The average length of time spent by interviewees working on their ILSs was as follows:

Autoskill	- 27 weeks
CCC	- 27 weeks
Jostens	- 10 weeks
Pathfinder	- 39 weeks

Of the four systems above, Pathfinder has the greatest distribution and has generally been around longer than the other systems while Jostens is the newest system in BC. These historical facts may help explain the averages pattern above, but other factors such as length of student sponsorship in a program by an agency, whether students attend part-time or full-time, and level at which they are working also affect length of time they stay with an ILS.

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[1] This student had moved on to Intermediate work, but still used Autoskill for review and reinforcement.

[2] CCC programs for adults are ungraded but include many different levels. It was not clear exactly where the students were placed.

[3] Most of these students were using CCC for its Algebra Topics program. They were not assigned to the system on a full-time basis.

From the project team's perspective, students generally had spent sufficient time with the ILS to have some opinions and feelings about computer learning in general and their system in particular. Where students were relatively new to the program and could not answer a question, they said so.

Time Spent on Computer and Other Activities in Program

It was difficult to get useful statistics on time spent on various aspects of ILS work and other activities because of the variations in systems, in the timetable arrangements of centres and students' schedules. However, some clear patterns did emerge. The average time per day spent on the systems by the students interviewed was as follows:

Autoskill - 1 hour
CCC - about 2 hours
Jostens - about 3 hours
Pathfinder - about 40 minutes

The time reflects system differences. As Pathfinder is mainly a computer managed system, students key in to obtain their assignments and tests. This does not take very long. Once they have their assignments, unless there is a piece of CAI software they are referred to, they are generally off the computer. They do their assignments from the textbooks and other suggested resources in the Pathfinder Library. Hence, the shortest amount of time on the computer is shown for Pathfinder.

Autoskill is limited in program offerings at this time and in the sites visited, there were more students in class than there were work stations, so Autoskill is used judiciously: those who need it most, appear to be the ones who use it. In the CCC sites visited, time on the computer is controlled through timetabling arrangements or other scheduling agreements. In one centre, students sign up initially for an hour and can stay on-line for up to 2 hours if nobody else is waiting for computer access. After 2 hours, however, they have to come off and do other work. In another setting, the CCC lab is shared by more than one class, so students have assigned lab time. Thus CCC is used as a supplement to or complement to other self-paced individualized work or group activity carried out under the supervision of an instructor. This is a user friendly system with lots of available courseware, so limited time on the system has been a conscious administrative decision. It is not surprising that Jostens is the system where students spend most time. It is an integrated learning system and in two of the three centres we visited, it is the program and students are sponsored to attend twenty five hours a week. The overall length in the program may also be limited by sponsoring agencies.

In terms of other computer applications, most students had no familiarity with them. The one which was most familiar was word processing and some of the systems have a word processing package which students can access to learn the skills and to do their written assignments. Of the people we interviewed, the students most familiar with word processing were those working with Jostens. Autoskill students and some Pathfinder students also had some familiarity with word processing. In one centre with a Pathfinder lab, there was also a MAC lab which was used for word processing and other computer applications. Some Pathfinder students had also taken keyboarding courses while working with the system. None of the students interviewed had experience with electronic communication, but many thought it would be "a neat idea".

When students were asked to estimate how much time they spent in their centres on different learning activities, it was clear that the majority of time was spent working on their own. Jostens and Pathfinder students spent most time working on their own - about 4 hours a day. In most instances though, students said they had access to instructors when they wanted help. "They're there for you," was a commonly heard phrase. In answer to a later question as to whether they would like to spend more time with the instructor, only 1 of the 20 Pathfinder students interviewed wanted more time, the rest were satisfied with the time spent with the instructors. Of the 11 Jostens students however, 4 wanted more time with the instructor, 3 of these 4 were from the same site which was not a "dedicated" Jostens site. There must be some other factors operating here, because, on the average, these same students reported spending more time with the instructor than other students on the system!

Only 1 of the 9 Autoskill students wanted more time with the instructor. These students on the average spent more time with the instructor - about 40 minutes a day - than any other system. As it is used in Fundamental ABE classes, this is understandable. CCC students wanted more time with the instructor, but it was not clear whether this was in relation to computer work or the other work that they undertake. Given what is known about those sites, it probably would be the latter.

In terms of group or class activity, the Autoskill students spent more time interacting with others than students on any other system. This reflects the way Autoskill has been introduced into the Fundamental ABE classroom. Whether group work is carried on in the other sites depends largely on demand and the philosophy of the instructors or centre managers. What seems to be typical is that space and time are set aside each week for group tutorials or group sessions on particular topics. These may include math and spelling, but several people mentioned the importance of having some group discussion and interaction around social studies topics and English literature. In only 3 of the Pathfinder sites visited, did students say they were involved in some group activities. One of these was a centre whose staff had received some in-service training from US literacy consultant Pat Rigg in the previous academic year (Rigg, 1993). They had worked hard to develop a feeling of community in their adult learning centre.

Table 13.

Students' Responses to Time on Computer by System

System (N)	More Time	Same Amount of Time
Autoskill (9)	5	4
CCC (6)	5	1
Jostens (11)	7	4
Pathfinder (20)	8	12
Total (46)	25	21

When students were asked if they would like to spend more, less, or the same amount of time on the computer each week, 25 students (54%) said they would like to spend more. The responses are shown in **Table 13**. It is interesting to note that for the systems in question nobody wanted less time! It is also interesting to note that with the systems where the curricula is predominantly on-line and students are already spending a fair amount of time on the systems, that the majority want even more! On the other hand, the Pathfinder users who do not spend much time on-line seem to be happy with that situation. Only 8 of the 20 (40%) want to spend more time. Pathfinder students are directed towards off-line materials for most of their assignments and appear to be happy with that arrangement. With the other systems, perhaps the reason people want even more time is the "addicting" tendency of computers - people become fascinated with what the machine does and how they interact with the computer.

As indicated above (p. 39), most people were satisfied with the time spent with their instructors, only 10 of the 46 respondents (22%) wanted more time. When asked whether they would like to spend more, less or the same amount of time on non-computer activities, 33 students (72% of respondents) said they wanted the same time, 8 students (17%) wanted less time, and 5 students (11%) wanted more. **Table 14** shows the results by system.

Table 14.

Students' Responses to Time Spent on Non-computer Activities

System (N)	More Time	Less Time	Same Amount of Time
Autoskill (9)	-	2	7
CCC (6)	-	2	4
Jostens (11)	-	2	9
Pathfinder (20)	5	2	13
Total (46)	5	8	33

It is interesting that the only people wanting more time on non-computer activities are the Pathfinder students who spend least time on the computer anyway! However, 4 of the 5 that wanted more time on these activities were in centres that did some group work and perhaps they particularly liked this way of learning and wanted more. It is also interesting that 8 students want less time on non-computer activities which are generally minimal anyway! But, 7 of these 8 said they wanted more time on the computer, so the logic would support less time somewhere else - in this instance on non-computer activities!

Access to Computers Outside the Program

Of the 46 students, 18 respondents (39%) said they had access to computers outside their program. The breakdown by system users is shown in **Table 15**.

Table 15.

Students Having Access to Computers Outside the Program

System	Number of Students	Percentage
Autoskill	3	17
CCC	2	11
Jostens	4	22
Pathfinder	9	50
Total	18	100

Of the 46 students, 27 respondents (59%) said they did not have access to computers outside the program but they would like to have one to work on at home. Only one person said he did not want a computer and this was the youth in the alternate Pathfinder program. Thus, all adults interviewed either had access to a computer or would like to have a computer. Three students indicated they had just bought a computer as a result of being exposed to them in their adult programs, and another person indicated she was planning to buy one.

Of the 18 who said they had access to computers outside the program, 7 said they used it for word processing, or typing, one said they used it for "letter writing", 3 said they either used it for or intended to use it for homework. Three students said they used it for "games" - one of these was a hearing impaired student. One person with a computer said it was "for the kids". Two others indicated that although they had a computer they did not use it very much.

Students' Favourite Subjects in their ILS

Students were asked which subject(s) they liked most and which they liked least. The results are shown in **Table 16**.

It is interesting to see that there were more likes mentioned than dislikes. Also, several students said they liked all their subjects. Some students named more than one subject; others were only studying the one subject so had no basis for comparison. With some students their traditional attitude towards the subject carried over to the computer based curricula. It is interesting, however, that math is so highly liked among the computer programs. For some students, these programs have really helped "turn them around" in math.

Table 16.

Students' Favourite Subjects

System (N)	Subject	Likes (N)	Dislikes (N)
Autoskill (9)	Math	2	-
	Reading	3	-
CCC (6)	Fundamentals of English	1	2
	Algebra Topics	2	
	Reader's Workshop	1	
Jostens (11)	English	1	-
	Writing	-	1
	Reading	-	1
	Math	6	-
	Science	1	-
Pathfinder (20)	English	3	4
	Communications	1	-
	Math	11	4
	Socials	2	3
	Science	1	1
	Family Management	1	-
	Reading	-	2
	History	-	1

Suggestions for Changes

Of the 46 students, 21 made suggestions for additional courses they would like to see on their ILS. **Table 17** shows the results.

Table 17.

Students' Suggestions for Additional Courses

System (N)	Courses	Number of People Suggesting
Autoskill (9)	Higher level English; "others"; spelling	3
CCC (6)	Sciences - physics, biology	2
Jostens (11)	Canadian history; social studies - maps; science; accounting; more English	6
Pathfinder (20)	Foreign languages; mechanics and trades subjects; power engineering; office administration; more computer subjects	10
Total (46)		21

When asked whether they found any part of the system frustrating, 4 out of 9 Autoskill respondents, 2 out of 6 CCC respondents, 7 out of 11 Jostens respondents and 5 out of 20 Pathfinder students said they found something that was frustrating to them. Some of the frustrations were with process or problems in the curricula which students may have encountered even in a traditional classroom. Others had to do with specific features of the systems.

With Autoskill one student did not like the latency (speed) feature in the reading program, and 2 did not like the voice feature in the auditory strand of the reading program. The biggest beefs with the Jostens system were the American spelling and American content. Students wanted Canadian English and Canadian content in history and social studies, or if the developer could not change the system, American dictionaries were requested to help with spelling. The Pathfinder students' frustrations varied: one felt that the assignments should be more relevant to the tests taken; others felt there was not enough direction given as to which books should be used, and which assignments should be done - they wanted specific textbooks for their courses and more sequential development in assignments. Other suggested changes were as follows: one student wanted the graphic codes on the system, not in a printout bound on the shelf. Also, one or two students mentioned that they would like to take the books home, but usually cannot. (Centres are afraid of books being misplaced, so they can only be used *in situ*.) Some students made suggestions for changes in the program environment - space, timetabling, faster computers etc.

Student Progress and Improvements

Table 18.

Numbers of Students Reporting Improvements in Subjects and Other Areas by System

System (N)	Reading	Writing	Math	Learning	Other
Autoskill (9)	6	7	6	7	4
CCC (6)	4	3	5	5	3
Jostens (11)	9	9	10	9	2
Pathfinder (20)	9[1]	12	16	16	14
Total (46)	17	31	37	37	23

The numbers in **Table 18** are quite impressive in terms of how students see themselves progressing. In the first three systems in the table, comments learners made about improving in reading were related to improved word recognition, better comprehension and expanded vocabulary. The Pathfinder students mentioned similar things but also cited increased speed in reading.

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[1] Because many of the Pathfinder students were working at the higher ABE levels, many stated they were already good readers, hence, they had shown no improvement while on the program. Usually, they were in the program to complete requirements for a credential.

Most of the improvements in writing related to the mechanics - grammar, spelling and punctuation - but several said they could produce better content. Notetaking, letter writing, descriptive stories, essays and assignments, and use of vocabulary were all cited as being improved.

The most enthusiastic responses came from students of math - on all systems. Of the 46 students, 6 were not currently studying math so had no comment. Thus, there were only 3 students out of 40 who felt they were not improving, one said she did not feel confident enough yet, and another said he preferred books and pen and paper for math rather than an on-line program. (The reason for this was not explained, but it might have to do with the limited time to do the math on screen, whereas he could take all the time necessary in the traditional way.) For many of the adults, the math acted as a refresher course or review. This aspect was mentioned by 6 respondents. Another fairly common response was along the lines of, "I can figure it out now for myself." The specific kinds of improvements in math skills cited were: rounding numbers, fractions, decimals, percentages, working the calculator, multiplication, division, working out areas and circumferences, how to lay a rug, algebra, business math, and metric. Some mentioned their achievements in terms of a specific grade level reached - grade 8 math, grades 9, 10 and 11 and algebra! Six respondents pinpointed algebra as an example of how they had improved in math, either because they were actually doing it, or because they now understood it. These students were either working on CCC or Pathfinder. One woman who had just finished Jostens, Tier 3 was really enthusiastic about her new found skills and said she really missed the math. Another Jostens user said he had improved "100 percent".

Enthusiasm for learning also showed itself with 37 out of 46 students answering affirmatively to the question, "Do you feel you are a better learner now?" Only 5 students answered negatively, the other 4 did not answer because they felt it was too early in their experience to pass an opinion. When asked how they were better, common answers included - more motivated (15 mentions); more organized (5 mentions); more relaxed (2 mentions); more disciplined (2 mentions); more concentration (3 mentions). Other answers were: keener student - take work home; more focussed; no competition - work at own mastery; improved study skills; look forward to homework; pick up on things more easily now; computer has helped with everything.

In the "other" category, some students felt they had already mentioned everything, but it gave others an opportunity to add something they had not mentioned previously. Nine of the respondents mentioned affective changes such as increase in self-confidence or self-esteem and improved family or social relationships. Others mentioned additional cognitive skills - improved spelling, map reading, better at science and sequencing, more knowledge about biology, improved organization of ideas, and just plain "thinking" (as the student has to do the work and remain alert). Some mentioned new practical skills such as: typing, notetaking, and communications on the job. Several also mentioned their ease with and knowledge about computers as a positive outcome of their learning experience.

Comparison of Program with ILS and Previously Attended Programs

Of the students interviewed, 29 (63%) said they had attended some other kind of program as an adult. Thirteen of the 29 had been in some form of academic upgrading program including GED preparation. The other 16 students had attended a variety of courses ranging from short term special interest courses (eg. first aid, bartending), to specific college training courses (eg. office administration) and correspondence courses. Six of the 29 had attended courses in provinces other than British Columbia.

When asked to explain the major differences between the computer-based program, they were now enrolled in and their previous programs, the following comments represent the range of opinions:

- Love this program. I feel good. Instructors take more time with you (CCC).
- Here you can be slow; take the time to learn (CCC).
- With the computer you have to work through it (CCC).
- Autoskill (math only) is more interesting/making math easier (2 responses).
- Computers are "neat".
- Previous program only helped quick students, in this one you get help when needed.
- The program (Jostens) is self-explanatory, more organized, sequenced, easier...
- This program (Jostens) is more flexible.
- Work at own pace, spends as much time as necessary (Pathfinder).
- Teachers here are very resourceful (Pathfinder).
- Teachers are more helpful here (Pathfinder).
- Like mastery comfort level. Ability to move on (Pathfinder).
- Better atmosphere here, everything explained. Not felt to be stupid (Pathfinder).
- I'm getting help, understanding and building confidence - there's more support (compared to correspondence courses) (Pathfinder).
- The previous program was just like high school, the centre here is different (Pathfinder).
- Here, move at own pace and one-on-one with instructor is more comfortable (Pathfinder).
- Computer does not beat about the bush - it makes learning easier (Pathfinder).

One person who had taken a college course in office administration felt she had to work a lot harder there to keep up with the course content. She liked having direct instruction and felt it was hard for her to work on her own, but was motivated and getting used to the computer program.

When asked to say whether they felt their current program with an ILS was better, worse, or the same as their previous adult program, 18 students said "better", 1 said "much better", and 5 said "about the same". The other 5 of the 29 students felt that either because of the nature of their previous courses, they could not make a judgement, or they were too new to the present course to form an opinion at that point.

Student Recommendations and Comments

When asked whether they would recommend the computer system they were working on to students with similar backgrounds to their own, 45 of 46 students said "Yes". The only one who did not respond in that way was the newcomer who said it was "too early to tell".

Students were asked then if they had any other comments to make or advice to give to adults thinking of entering a program with an ILS. The responses are shown below.

Autoskill (N=9)

- Try it, have patience.
- Enjoyable. For oral reading need instructor there all the time.
- It helps. Good clipboard teacher. "Time out" feature on machine controls time, not the student.
- Highly recommend it. Helpful with math and with giving computer skills.
- If illiterate, it helps with reading. Sound distinctions help with spelling. Some parts easier than others.

CCC (N=6)

- Likes audio component. Take more time. Work at own pace.
- Have already recommended it for math, spelling, English grammar (response from a new Canadian).
- It is a good tool. Adults can be nervous. My husband is on it all the time - he was petrified at first.
- I like having lots of computers here.
- Computers are really beneficial, especially for math. They show you step by step what to do. English is harder, but still beneficial (response from a new Canadian). Every school system should have one.

Jostens (N=11)

- More interesting than books. Work at own pace. Explains things well. Easy to learn.
- Computer helps you to learn quickly. Self explanatory - easier than a book. Computer shows you your mistakes.
- Recommend without a doubt. Very beneficial. Have recommended it to others. Eager to get to school. Should be a law: People don't go to school from 16-19 years; go after they're 20 years!
- Where was this system 10 years ago? It helps dropouts from regular school and adults. Will open doors for these people. People can get grade 10 and GED with this.
- I learn more on the computer than reading any book I ever read. Learned spelling, history, science.
- People should come in for "hands-on" demo - to see the capabilities. Computer access was not part of schooling of older people.

- Time seems to fly so fast. Need longer time, more practice (an evening student).
- Have recommended it to others at my workplace.
- Computer programs help a lot.
- I think it is a lot of help for people that don't have any knowledge, because of all the workplaces that you go where you have to have the computer.

Pathfinder (N=20)

- It is set up perfectly for each individual.
- Helpful system.
- Self paced.
- Need skills to get job.
- Prefer to PLATO. Wide area of knowledge, more hands-on books. More freedom than regular high school.
- "Fun".
- Already recommended it.
- There is no one telling me what to do. I can pace myself.
- We become more independent learners.
- Access to information resources. Machines tell you where to go - improved learning capacity.
- Dragging all my friends to the site - many are single moms and have child care problems.
- I've noticed that the "delinquent kids" (alternate school program at site) like it. Lack of authority - not rigidly controlled.
- Wished had it in regular school and let kids go and use it. Have own path - individualized. Inspired me to become a paramedic.
- Go at own pace, in own time - flexible hours. Takes away pressure (of learning). Treated like an adult.
- Likes the combination of teaching (small group work) and Pathfinder in a storefront operation.

Summary and Conclusions on Students' Comments

From the above comments, it seems that the best ambassadors for CMI/CAI and the ILSs are the students themselves. It is interesting that most of the comments relate to the advantages and features of computer-based instruction in general rather than specific features of the various systems. There is probably a "halo effect" operating around the use of computers, especially with a population that had less than satisfactory experiences in regular high schools or traditional ABE classrooms. Only someone who has been exposed to another ILS could begin to offer a comparative analysis or comment (like the Pathfinder student who had worked on PLATO).

A very major advantage of the use of the ILSs appears to be that they have made adult learning opportunities more accessible to sectors of the population who normally would not be able to avail themselves of academic upgrading. Shift workers, seasonal workers, single moms, the newly unemployed and social assistance recipients, new immigrants, can, it seems, be more easily accommodated in adult learning centres with ILSs. In more isolated parts of the province, some adults wanting "to get their education" previously only had the correspondence course route open to them. This was less than satisfactory if adults did not understand the material and had inadequate explanations, or suffered from any literacy or numeracy difficulties. Adult Learning Centres with sympathetic instructors and computer back-up have begun to open up new horizons for many adults in such places. The whole issue of access to learning is one which has occupied adult educators in this province for many years. Obviously the technology is helping in this regard.

Responses of Students to Computer Learning

Part C of the student interview presented fourteen statements for student agreement or disagreement. Students were asked to respond in the light of their experience with their particular ILS to date. The number of student responses is shown in **Table 19**. The statements with which there is most agreement are, in order, numbers 3, 11, 7, 9, 2, 12 and 10. In this order, the "don't know" category has been factored in and given the lowest score because a clear opinion is not forthcoming.

These statements generally have to do with the commonly held beliefs about advantages of computers. The most enthusiastic group of students appeared to be those working on the Jostens system. There were proportionately more "strongly agree" responses from this group than any other for statements 3, 11, 7, 12, 2, 9 and 8. The responses ranged from 8 to 5 strongly agrees for these statements out of a total of 11 responses.

The statement with which there was most disagreement was number 5. Interpreted positively, it meant that most students (40 out of 46) feel that computer learning is faster than other learning methods. This is another often stated advantage of computer learning.

Statement number 6 was skewed by the large number of students who did not respond (i.e. DK), either because they had not attended other programs, or the program was one that was not really comparable. Twenty-four of the 25 who did respond, however, felt using the computer system did provide a greater variety in learning activities than other programs they had attended.

Statements where there was a mixed response were numbers 4, 13, 8, 1 and 14. Further analysis of these statements was done by system to see if there were any patterns specific to the systems. The results are shown in **Tables 20 to 24**.

Table 19.

Responses of Students Currently Working with an ILS to Computer Learning

(Answers were "Strongly Agree" (SA), "Agree" (A), "Disagree" (D), "Strongly Disagree" (SD) and "Don't Know" (DK).)

Statement	Number of Responses (N=46)				
	SA	**A**	**D**	**SD**	**DK**
1. Using the computer for learning made me nervous when I started.	8	19	12	7	-
2. Using the computer for learning is easy.	13	30	3	-	-
3. Using the computer for learning allows me to learn at my own pace.	22	23	1	-	-
4. Using the computer for learning encourages me to work with others.	6	16	22	-	2
5. Using the computer for learning is slower than other learning methods.	-	2	26	14	4
6. Using the computer for learning provides greater variety in learning activities than other adult learning programs I have attended.	9	15	1	-	21
7. Using the computer for learning is an efficient use of my time.	17	28	-	-	1
8. Using the computer for learning increases my interest in subjects more than other learning methods.	15	21	5	-	5
9. Using the computer for learning means I get the instructor's help when I need it.	13	32	1	-	-
10. Using the computer for learning allows me to work with materials relevant to my needs.	10	31	1	-	4
11. Using the computer for learning has made me want to learn more.	22	23	-	-	1
12. Using the computer for learning has made me a more confident learner.	21	19	2	-	4
13. Using the computer for learning means most of my time in class is spent working on the computer.	3	13	25	3	2
14. Using the computer for learning means I feel I can use computers in my everyday life.	15	20	8	-	3

Statements 4 and 13 are somewhat related, as are items 1 and 14. Statement 8 is more on its own, and in the "mixed" category because of the 5 "disagrees" and the 5 "don't knows". **Table 20** shows the responses for this statement by system.

Table 20.

Student Responses to Statement 8 - Increased Interest in Subjects in Comparison to Other Learning Methods

System (N)	Number of Responses					Percentage of Agreement
	SA	A	D	SD	DK	
Autoskill (9)	3	5	-	-	1	89%
CCC (6)	-	4	1	-	1	83%
Jostens (11)	5	4	1	-	1	82%
Pathfinder (20)	7	8	3	-	2	75%
Totals (46)	15	21	5	-	5	-
% (100)	33	46	11	-	11	-

It is interesting to note that the highest level of agreement is with the systems used at the Fundamental ABE level and that the agreement level decreases towards the higher end systems. There may be "novelty" and "experience" factors entering into these responses.

The breakdowns of responses by system to statements 4 and 13 are shown in **Tables 21** and **22** respectively. If the "don't knows" are excluded in **Table 21**, students are equally divided in their responses to statement 4: 50% are in agreement (with 14% agreeing more strongly to the statement); 50% are in disagreement. This had been a statement to which the project team expected a stronger disagreement, because of the known advantages of computer learning such as individualization and self-pacing. Statement 4 is related to statement 5 in Part C of the instructor's interview schedule where responses are more towards the disagreement end of the scale. When students were probed about their answers, many said they saw what other students were doing and they talked about their work or offered to help each other.

Table 21.

Student Responses to Statement 4 - Encouragement to Work With Others

System (N)	Number of Responses					Percentage of Agreement
	SA	A	D	SD	DK	
Autoskill (9)	2	4	3	-	-	67%
CCC (6)	1	1	4	-	-	33%
Jostens (11)	2	3	6	-	-	45%
Pathfinder (20)	1	8	9	-	2	45%
Totals (46)	6	16	22	-	2	-
% (100)	13	35	48	-	4	-

Table 22.

Student Responses to Statement 13 - Most of Class Time Spent on the Computer

System (N)	Number of Responses					Percentage of Agreement
	SA	A	D	SD	DK	
Autoskill (9)	-	2	6	-	1	22%
CCC (6)	-	1	4	-	1	17%
Jostens (11)	3	6	2	-	-	82%
Pathfinder (20)	-	4	13	3	2	20%
Totals (46)	3	13	25	3	2	-
% (100)	7	28	54	7	4	-

Responses to statement 13 (**Table 22**) reflect what is known about the way the systems are used in the sites visited. Time on the computer is limited in the Autoskill and CCC programs to allow students' participation in other learning activities. Jostens' students spent most of their class time on the computer. Pathfinder students typically only spend a short time each session. The small number of Pathfinder students who said they agreed with the statement were ones who either likely had some CAI software program they were working on as part of their current course, or were using word processing for their assignments.

Student Ease With Computers

It is interesting to compare statements 1 and 2. **Table 23** shows the responses to statement 1. Fifty eight percent of the students agreed to being nervous when they started, but 93% said using the computer for learning was easy (statement 2). Some of this ease of use contributes to student confidence as partially reflected in the responses to statement 14.

Table 23.

Student Responses to Statement 1 - Nervousness When Beginning with the Computer

System (N)	Number of Responses					Percentage of Agreement
	SA	A	D	SD	DK	
Autoskill (9)	2	5	2	-	-	78%
CCC (6)	1	3	2	-	-	67%
Jostens (11)	2	4	3	2	-	55%
Pathfinder (20)	3	7	5	5	-	50%
Totals (46)	8	19	12	7	-	-
% (100)	17	41	26	15	-	-

The highest levels of agreement with statement 1 came from students using Autoskill, followed by CCC students. The Autoskill system was being used by people at the Fundamental ABE level, many of whom had not had previous exposure to computers. CCC was also used at Fundamental level and half the sample was made up of recent immigrants who also had limited computer experience. The answers of Jostens and Pathfinder students were more evenly distributed. Those who disagreed were working at higher levels of ABE and/or had previous experience with computers.

It is interesting to compare the responses to statement 1 with those to the last statement - number 14. **Table 24** shows the results.

Table 24.

Student Responses to Statement 14 - Ability to Use Computer in Everyday Life

System (N)	Number of Responses					Percentage of Agreement
	SA	A	D	SD	DK	
Autoskill (9)	3	3	2	-	1	67%
CCC (6)	2	4	-	-	-	100%
Jostens (11)	4	5	2	-	-	82%
Pathfinder (20)	6	8	4	-	2	70%
Totals (46)	15	20	8	-	3	-
% (100)	33	43	17	-	7	-

Despite the high degree of nervousness among Autoskill students when they started with the computer program, two thirds of them feel they could now use computers in their everyday life. This proportion, however, is the lowest among the four systems. Although two thirds of the CCC students felt nervous about computers when they started, they all now feel they can use computers in their everyday life. Jostens and Pathfinder students also feel confident about using the computer in their everyday life. Those who disagreed fell into two categories: either they were confident around computers before they came into the program; or they felt computers in the working world probably demanded more skills than they had acquired with their ILS experience. While the latter may be true in many circumstances, the perceived confidence of students around computers is a trait which should transfer positively to a new educational or work setting.

RESPONSES OF STUDENTS NOT CURRENTLY WORKING ON ILSs

Student Demographics

Twelve students who had previously worked on an ILS were interviewed. The students came from five different sites across the province (two sites on Vancouver Island, one in the North-Central region, one in the Kootenays, and one in the Lower Mainland). Between them they had experience with four of the systems - Autoskill, Jostens, Pathfinder, and PLATO. **Table 25** shows the major characteristics of the interview group.

Table 25.

Major Characteristics of the Students Not Currently Working on an ILS, by System

System	Number of Students	Gender		Age Group in Years		
		M	F	18-25	26-40	41-55
Autoskill	3	1	2	-	3	-
Jostens	2	-	2	-	1	1
Pathfinder	4	1	3	1	3	-
PLATO	3	2	1	1	2	-
Total	12	4	8	2	9	1

Table 26.

Sites and Levels of Education of Students Not Currently Working on an ILS by System

System (N)	Sites Where Studied		Education Level			
	College	School District	Intermediate	Advanced	GED	Post Grad
Autoskill (3)	1	-	1	2	-	-
Jostens (2)	1	-	-	-	2	-
Pathfinder (4)	-	2	-	3	-	1
PLATO (3)	-	1	-	2	1	-
Total (12)	2	3	1	7	3	1

Five of the students had studied at a college. Seven of the students had studied in school district programs. The Autoskill and Jostens students had completed their ILS programs and moved on to another level or program within their institutions - both were colleges. The Pathfinder students were drawn from two sources - a community college and a school district. However, all students had attended school district programs. One student had completed her grade 12 and moved on to the local community college to take a Business Administration course. The other three students had completed their Pathfinder work and had moved on to other courses in their adult learning centre. The PLATO students were currently working on Pathfinder or other courses in their adult learning centre.

Length of Time on Computer and Other Activities

Respondents had spent an average of 38 weeks on their systems. The range was from 4 weeks up to 2 years. The person who spent only 4 weeks was one of the Jostens students. This was a sponsored program for newly displaced workers and was designed as one component of a retraining program. This lady, however, was a mature married woman, with grade 12 English, many years of solid work experience with the one employer and she had several years of on-the-job use of computers. She breezed through the Jostens program. She needed a more challenging program. The person with the longest experience was a PLATO student who entered at a low level and was working towards the GED in order to enter a trades program.

As with the students currently working on the systems, it is difficult to pinpoint exact time spent in various activities, but patterns can be seen. The Jostens students spent most time on the system (3.5 hours a day), followed by PLATO students (2.6 hours a day), and Autoskill (1 hour a day). In those three systems that was time spent doing on-line work. The Pathfinder students spent on average about 20 minutes a day obtaining their tests and assignments but very little time, if any, doing on-line work.

Regarding other applications, the Autoskill students indicated they spent time doing word processing with "Pro-Write". The time varied with the invidivual, but they said they did it each day in class. The Jostens students used word processing for their essays and assignments. One each of the Pathfinder and PLATO students said they used word processing for their assignments. None of the students had been involved in electronic communication with others. The only other application mentioned was the use of a typing tutor - mainly to improve speed.

All of these students except one Pathfinder student had attended programs where there was some class or group activity during each week. As with the other group of students interviewed, time spent with the instructor on a one-to-one basis happened when the students needed help and again, students said instructors were there when they were needed. The bulk of the time in the program was spent working on one's own assignments and tests both on and off the computer.

Table 27 shows students answers to the question about how much time they would have liked to spend on various activities: More (M); Less (L); or the Same (S).

Table 27.

Time Students Would Have Liked to Spend on Activities by System

	Time on Activities								
	Computer			Non-Computer			With Instructor		
System (N)	M	L	S	M	L	S	M	L	S
Autoskill (3)	-	-	3	1	-	2	-	-	3
Jostens (2)	1	-	1	-	-	2	-	-	2
Pathfinder (4)	3	-	1	-	-	4	2	-	2
PLATO (3)	1	1	1	2	1	-	-	-	3
Total (12)	5	1	6	3	1	8	2	-	10

It is interesting, and not surprising that 3 of the Pathfinder students would have liked to spend more time on the computer. As previously explained, there is little on-line learning with Pathfinder and students may well have wanted to explore this method of learning. The PLATO student who wanted more time already had a full timetable, but he was a man in a hurry - wanting to reach his goal as quickly as possible (to enter a trade). The Jostens participant had just spent 6 weeks in the course and it seemed to have whetted her appetite for more.

It is interesting that 2 of the 3 PLATO students wanted more non-computer activities in the program. The one who said he wanted less of this activity was the one mentioned above who wanted more time on the computer. Other students appear satisfied with the amount of time spent on non-computer activities.

It is also interesting to see in this group, that most of the students (83 percent) were satisfied with the amount of time instructors spent with them. One of the Pathfinder students who wanted more time, explained that she was an auditory learner and needed to hear things to learn most effectively.

Access to Computers Outside of Program

Seven of the 12 students had access to computers outside the program. Two students indicated that they went out and bought computers after starting in their programs. Four of the students said they used the computers for word processing their assignments. One person said she did a Consumer Education course at home on the computer. Others used it for "math" and "homework". Of the 5 students who did not have access at the time, one has since gone out and bought one; the other 4 students said they would like one.

Students' Suggestions for Changes in ILSs

Some of the frustrations with the systems mentioned by these students were as follows:

- Autoskill - the latency feature;
  - beginning with little nonsense words, sounds in reading program.
- Jostens - found the English repetitive, would have preferred more group work;
  - some of math had unclear explanations.
- Pathfinder - too many references in assignments - not clear which ones to do and how many.
- PLATO - if failed a test, had to redo everything;
  - couldn't figure out the algebra.

Some of these frustrations were behind recommendations for changes which show up in the table below. In terms of course additions, it could be that students do not really know what is available and were suggesting subjects that would be of interest to them to learn from the ILS.

Table 28.

Students' Suggestions for Changes in ILSs by System

System (N)	Course Additions	Other Changes
Autoskill (3)	Expand math - algebra. Higher level math. Science. Computers - how to fix.	Change voice in auditory reading strand (not clear) (3x).
Jostens (2)	Computer courses. Higher levels all subjects - more science.	Math on screen is not explained same way in manual. Canadian content needed. GED is not real grade 12.
Pathfinder (4)	Physics and Biology 12.	Ability to take books out for homework. More variety in test questions (redundancy). Have 'core' textbooks rather than choice in library.
PLATO (3)	Biology	Not as much time in front of screen - posture comfort factor.[1]

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[1] This person was the one who wanted less time on the computer in **Table 27**.

Student Progress and Improvements

Table 29 shows how this group of students felt they had improved. Among the subjects, again, math is the subject cited with most improvement (compare with **Table 18**, page 43). The high level Jostens student and 2 high level Pathfinder students said they were already good at reading so did not notice any improvement. The same reasons were given by 2 of the students for writing. Two others just felt they were not any better at writing. All students in this group said they were better learners - and this is with the benefit of hindsight and subsequent experience. Ten of the 12 students mentioned other areas of improvement not already cited.

Table 29.

Numbers of Students Not Currently Working on the ILS Who Reported Improvements in Subjects and Other Areas by System

System (N)	Reading	Writing	Math	Learning	Other
Autoskill (3)	3	2	2	3	2
Jostens (2)	1	-	2	2	1
Pathfinder (4)	2	3	4	4	4
PLATO (3)	3	3	2	3	3
Total (12)	9	8	10	12	10

In reading, Auotskill students said they had improved in the following: speed of reading, comprehension, increased interest, confidence, spelling (2x), pronunciation, knowledge of short vowels and silent letters. One Jostens student said her concentration and reading comprehension had improved. Two Pathfinder students said their speed of reading had increased and one of them also added that word recognition and comprehension had improved, and she had more interest in reading. Improved speed and comprehension as well as increased confidence were mentioned by the PLATO students.

Writing improvements included: use of vocabulary; note and letter writing; spelling; organization of ideas; use of thesaurus; better use of grammar; better paragraphs. In mathematics, 2 respondents said the program was useful "as a refresher". The 2 Autoskill students had improved in multiplication and algebra respectively. One Jostens student felt that she had definitely improved in everything - fractions, algebra, geometry. Pathfinder students had improved in doing decimals, fractions, problems and trigonometry. One PLATO student who was a mother said she had improved "lots" and can now help her children with their math. Fractions and decimals were mentioned by another PLATO student.

In terms of being a better learner, students said they were: more motivated (5 mentions); more organized (2 mentions); more confident (2 mentions); better study habits (2 mentions); more patient and, had learned how to learn. One Autoskill student said he used to hate English, but now loves it and is better at it. One Jostens student said learning was "fun and more interesting".

In other areas, 6 students also said they felt more confident about themselves and learning. One Autoskill student said she went out and took an Industrial First Aid Certificate as a result of her improved listening skills and confidence. Three students said they felt more confident in the use of computers, and one PLATO student said he had better relationships with people as his life skills had improved.

Comparison of Program with ILS and Previously Attended Programs

Of the 12 students, 8 had attended a previous educational program as an adult. These ranged from full-time ABE in a community college and life skills kinds of courses to continuing education courses on computer programs and correspondence courses. In trying to explain the differences between the programs, one student said, "My life changed when I entered _______'s classroom". This is part tribute to the ILS but more importantly, to the instructor. One person found the computer presence helpful. One Pathfinder student who had previously attended a small self-paced class in a college ABE program, said there were more students in the Pathfinder program, but the teachers were there when needed and were subject specialists. One PLATO person who had worked on correspondence courses, liked having an instructor to help her and also said she was more focussed in the centre than she was working at home. Another PLATO person said computers helped people with different learning styles and helped them work at their own pace. He had previously attended a traditional ABE class in Alberta.

Five of the 8 students said the program with the ILS was better than the previous programs they had attended, but one of those stressed it was more her own attitude towards learning that had changed. (She had previously attended a BC college ABE program in 1976.) One of the 8 students said the program was "about the same". Both the ILS program and the previous program had been taken by this person in the same adult learning centre in a small town. She was also the 'auditory' learner mentioned earlier. The other 2 students felt the ILS program could not be compared with their other programs because of the nature of those courses (life skills, computer skills).

Comparison of Program with ILS and Current Program

Nine students offered some comments in this regard. Two felt their current program could not be compared as it was a short course on career explorations. The auditory learner liked her semester-based program because she had an instructor and group work, however the downside was having to keep up with the pace set by the instructor rather than working at her own pace as she had in the ILS program. Two students liked the extension of work into computers in their present program. One Autoskill student was working with DOS in her more advanced ABE class, but missed the smaller class and closeness between students and instructor in the Fundamental ABE class. Another student from the same program, however, felt he was not getting enough computer use in his current ABE class, but could go to his former computer lab for practice on his own time. A former Pathfinder student had moved on to doing more computer work on the MAC. Another Pathfinder student felt she was going more slowly in her current program than she did with Pathfinder. The PLATO students had moved on to Pathfinder and one said she enjoyed the reading aspects [from books]; another said Pathfinder concentrates on student weaknesses and he does not have to redo everything as on PLATO.

Student Recommendations and Comments

All 12 students said they would recommend their ILS to others with similar backgrounds to themselves. The comments made by the students are as follows.

Autoskill (N=3)

- Would like it for my son for him to learn the sounds.
- Wish I had this system at home for my children to learn on. I still don't understand the sounds and did not complete that part. Would like to go to the community group [it has the system] to finish it up.
- Opened up my future - different from books and instructor. I'm going for my provincial and then on to fisheries.

Jostens (N=2)

- Most of system too easy for me as I already have grade 12 English and much computer expertise.

Pathfinder (N=4)

- Pathfinder more accessible and user friendly than present computer program.
- Pathfinder helped me get my grade 12 qualification and the success and confidence to go on to college.

Plato (N=3)

- Hard on eyes and posture when sit in front of screen for long time, but it's OK, progress is made.
- I have interested my girlfriend in taking PLATO. I took it to help my children with their school work. PLATO is a good foundation for Pathfinder.
- Try it! It made me less nervous. Rate of learning on computer, however, depends on the subject.

Summary of Students' Comments

While this sample of students is smaller than the other group, similar patterns, trends, and issues have emerged on similar questions. Unfortunately, there were no CCC students in this sample, but there were some reactions from students who had worked on PLATO. Generally, again, students seem well satisfied and pleased with their progress while working with an ILS and enthusiastically recommend their use to other adults contemplating a return to school. An underlying tenet of adult education is that adults are or should become autonomous learners. The stimulus of an ILS seems to have the effects of imbuing many learners with self-confidence and proving to them that they can learn and progress. This success feeds on itself and many adults see other possibilities opening up for themselves. Multiple chance learning can pay dividends for many undereducated British Columbians.

Responses of Students Not Currently Working on ILS to Computer Learning

In the last part of the interview, students were asked to say whether they strongly agreed (SA), agreed (A), disagreed (D), or strongly disagreed (SD) with the following 14 statements. There was also a don't know (DK) category in case that was needed. **Table 30** shows the results of asking these questions to the 12 students in this sample.

Table 30.

Responses to Computer Learning

Statement	Number of Responses (N=46)				
	SA	A	D	SD	DK
1. Using the computer for learning made me nervous when I started.	2	6	3	1	-
2. Using the computer for learning was easy.	4	8	-	-	-
3. Using the computer for learning allowed me to learn at my own pace.	7	5	-	-	-
4. Using the computer for learning encouraged me to work with others.	1	7	3	1	-
5. Using the computer for learning was slower than other learning methods.	-	4	6	2	-
6. Using the computer for learning provided greater variety in learning activities than other adult learning programs I have attended.	1	4	1	-	6
7. Using the computer for learning was an efficient use of my time.	6	6	-	-	-
8. Using the computer for learning increased my interest in subjects more than other learning methods.	3	5	4	-	-
9. Using the computer for learning meant I got the instructor's help when I needed it.	5	4	1	1	-
10. Using the computer for learning allowed me to work with materials relevant to my needs.	4	7	1	-	-
11. Using the computer for learning made me want to learn more.	4	6	2	-	-
12. Using the computer for learning made me a more confident learner.	5	6	1	-	-
13. Using the computer for learning meant most of my time in class was spent working on the computer.	1	6	5	-	-
14. Using the computer for learning meant I felt I could use computers in my everyday life.	6	3	2	1	-

The items around which there is most agreement are statements 3, 7, 2, 12, 10, 11. The item around which there is most disagreement is statement 5. Items with mixed responses but which lean more to agreement are statements 1, 8, 9, 14. Statements 4, 6 and 13 need some special explanation.

The items around which there is most agreement are the features generally touted as being the great advantages of computer-based instruction. The level of disagreement with statement 5 also fits with an advantage of computer-based instruction - increased rate of learning, because of the individualized, interactive nature of ILSs. Items 1, 8, 9, and 14 depend more on individual experience and attitudes, hence it is not surprising to see a more mixed response to these items. For instance, people who disagreed with statements 1 and 14 were those who already had some experience with or exposure to computers. Items 8 and 9 would depend more on one's preferences and expectations.

The responses to item 4 are fascinating. It was expected that students would disagree with this item because of the individual nature of computer instruction. It is also interesting that the responses were mixed within each of the system groupings. Responses therefore are based on individual's experiences and attitudes. However, a higher percentage (67%) of students in this sample, agreed with statement 4 than those in the previous sample (48%) - see **Table 21**, page 51.

The responses to statement 6 are limited because several students had not attended other adult programs or ones which could be compared with an academic upgrading program. However, of those who did respond, most agreed with the statement. For statement 13, those who disagreed were Autoskill students whose use was limited to about one hour a day in a full-time program, and Pathfinder students whose use traditionally is limited to obtaining documents and doing tests. One of the ex-Pathfinder students indicated he had used some of the CAI programs available within Pathfinder's library so he agreed with the statement.

The purpose of this part of the questionnaire was to act as a quick summarizer of opinion regarding various features and issues related to ILS use. It seems to have fulfilled that purpose, and generally similar patterns have emerged with both student samples.

5. SUMMARY

The major thrust of this project was to analyze how six ILSs were being used in ABE programs in British Columbia. After finding out where the systems were located, three instruments were developed for use in interviewing instructors and students including some students who were not currently working on an ILS. An itinerary was developed to include a reasonable sample of sites for each of the systems and to represent college and school district programs. One community program manager was visited and interviewed to obtain more information about one of the systems which was not strongly represented in the public educational institutions in the province.

Twenty sites were visited across the province. Twenty one interviews or surveys with instructors or lab managers of six ILSs were undertaken and the data incorporated into this report. Forty six students currently working on one of four of the ILSs (Autoskill, CCC, Jostens, Pathfinder) were interviewed. Twelve students who had worked on one of four of the ILSs (Autoskill, Jostens, Pathfinder and PLATO) were also interviewed. So few people are using the PALS system that data from these interviews were not incorporated into most of the report. The responses of the manager were incorporated into the textual analysis of instructor responses and in the overall results of the ILS analysis.

Generally, the project team felt positive about what they saw and experienced, and the students interviewed seemed positive and enthusiastic about their work with an ILS. None of the systems are perfect and several have small glitches and inconsistencies. Some of these may be compared to "typos" or inconsistencies in textbooks. Some arise perhaps out of having different developers of courseware. Some arise because of the literalness of computers. Some of these small things can frustrate students. Examples are: students having to use an uppercase letter for True (T) rather than lower case (t) in order to have the answer marked right; having to strike the "enter" key before typing in the answer; careless 'proof-reading' by developers so that answers marked incorrect are actually correct. The degree to which these are identified, passed on to developers, and corrected in subsequent issues or upgrades is a measure of commitment of vendors to their clients and to professional development.

Administrators and instructors considering a purchase of an ILS should examine their student body and their instructional needs, as well as its "fit" with their educational philosophy and potential demand for services. ILSs are expensive so, before making an outlay, it is important to do this analysis of needs. The guidelines in Appendix A were developed to help potential users ask pertinent questions and evaluate their answers. It could be that no ILS is needed, or that a customized computer lab using a variety of computers and CAI software is more beneficial.

None of the current systems seem to fit too well with upper ABE levels for college programs at the present time. Pathfinder is closer to meeting the needs of upper level school district programs, because it was developed using school curricula and because of the work of the BC School Districts Consortium. The systems seem useful at Fundamental and Intermediate levels and for GED preparation. How they are used and with what emphasis depends on the system's courseware and the training and philosophy of the instructors and program administrators.

There is no doubt that the technology is here to stay and will be getting more sophisticated. Good practice does not negate ILS use, but determines how it is used. The technology has and is increasing student access to learning and making autonomous learners of many who enter these programs. These are trends which will likely increase in the future as we move into the era of "cyberspace".

6. ILSs - THE NEXT GENERATION

Sherry (1990) has stated ILSs "do not possess the level of learner-adaptiveness and artificial intelligence that education's yet-to-be-developed computer-assisted learning systems will one day possess" (p. 86). A truly "integrated system of learning" is not yet a reality. What are the characteristics of such a system? How far away is this ideal?

There are some important philosophical questions to consider when analysing the effectiveness of current and future systems. Learners want to feel empowered and enabled by this technology to achieve their educational goals. ABE instructors are concerned that the ILS meets sound andragogical principles and provides even greater facilitation for 'debugging' a student's learning. They also want to know if an ILS is able to ease the clerical workload of testing, filing and the myriad other tasks involved with a competency based system. Some stakeholders, particularly administrators, will wonder about the value and cost of an ILS compared to that of traditional technologies as well as competing systems. For all stakeholders the most important issue will be the ease with which the system can be modified to meet ever changing instructor and learner needs. Sherry's ideal Integrated Learning System will have to help educators create a "world made transparent by the communications webs" (Illich, 1971, p. 157). This innovation is called "informatics - computers linked to electronic communication systems" (Knappler, 1988, p. 92).

Before this can happen, major initiatives in education are required to provide appropriate training, hardware and software. Administrators and educational institutions should first encourage teachers to become computer literate, then communications technology literate. Secondly schools need to be encouraged to become learner rather than teacher-centred. Thirdly teachers should be provided experiences in their new roles as instructional designers, managers, and motivators of learners (Fahy, 1987, p. 22). Computers have heralded a fourth revolution in education. The first was the establishment of formal learning, the second the invention of writing and the third the invention of the printing press. This latter technological invention dramatically affected how humans were taught. Like most technologies of the late twentieth century the infomation age is changing society at a much greater rate.

Dede (1989) discusses how evolving information technologies will transform the nature of work and in turn affect the design and content of the school curriculum. People are just beginning to experience "cognition enhancers" that combine "complimentary strengths of a person and an information technology" (p. 23). One category of a cognition enhancer is the empowering environment in which the machine handles the routine mechanics of a task, while the person is immersed in its higher-order meanings. The word processor with spelling checker, thesaurus and graphics capabilities provides a good example. These "desktop publishing" tools bring to modern day reality the expression that the power of the press belongs to those who own one. All of the ILSs reviewed either include these tools or allow for them to be added to the system.

Hypermedia, another cognition enhancer, is not yet an integral part of any of the systems reviewed. This computer software program, is "a framework for creating an interconnected, web-like representation of symbols (text, graphics, images, software codes)" (Dede, p. 24). Imagine a series of transparent cards. Attached to each of these cards is a button. Each of these buttons can activate an educational resource or information provider. This could be a video segment, a textbook or an encyclopedia. Increasingly it could also be an Internet telecommunications connection to a human resource (another student or teacher) – in fact any imaginable resource. The user would then be linked to any information, person or place desired. "Hypermedia is the scholar's and the scientist's dream" (Lemke, 1993).

The emerging hypermedia capabilities of the Internet are already dramatically altering learning paradigms. The Internet as the world's largest computer network, connects educational, government and commercial institutions in thirty-five countries. The British Columbia Ministries of Education and Skills, Training and Labour have committed to link every school, college, institute and university in the province to this resource.

> Libraries and computer centers will integrate their functions. There will be seamless connections of local-area networks and wide-area ones, so that we will as readily use this medium to share instructional materials with our students (as they will share their projects with us) as to share professional work with our colleagues. And this in turn will revolutionize the paradigm of education and learning itself. (Lemke, 1993).

While ILS system marketing representatives expressed curiosity and interest in offering connections to the Internet, none of the systems reviewed do so. One site a project team member visited does offer this capability to its students. A college ABE program in the interior of British Columbia, that did not have the resources to purchase a commercial ILS, was able to aquire the hardware and software necessary to connect student workstations to one-another and to the Internet. The instructor has then structured his own curriculum along the lines Lemke suggested above. While this program was outside the parameters of this project, it was intriguing to see what a classroom instructor can do given the appropriate technological support and the resources of the Internet.

In a world of cognition enhancers, the global marketplace is altering the workplace. The impact on instructional practice, and curriculum content and design will be profound. Thanks in large part to the Internet, the following developments are occurring or soon will be:

- a new definition of human intelligence; a partnership between human strengths and the computer's cognition enhancing capabilities,
- a greater emphasis on collaborative learning as combined computer and telecommunications technologies allow individuals and communities in a variety of places and circumstances to interact,
- improved methods of assessing individual learning needs,
- life-long "learning-while-doing", thanks to these same telecomputing networking capabilities,
- a curricular shift from presenting data to evaluating and synthesizing ideas, and
- a focus on solving real-world problems using concepts and skills from multiple subject areas (Dede, 1989, p. 25-26).

Given an opportunity to develop an informatics curriculum using one of the reviewed ILSs or other appropriate technologies, what parameters should be followed and what skills developed? How can an ILS be adapted or created so that it gives that window of opportunity? Fawson and Smellie (1990) give some specific guidelines:

- Mastery learning models should be implemented more efficiently and effectively with the use of technology, providing students with a greater role and responsibility for their own learning outcomes.
- Technology should permit teachers to become facilitators of learning experiences rather than dispensers of information.
- Technology should reduce the time teachers spend on the many administrative functions that now encumber them.
- Technology should permit a transformation of the instructional process that leads to alternative teaching configurations It should also expand the learning environment, which would result in increased creativity and more on-task behavior by students.
- Technology should help schools and school districts reduce instructional time and administrative cost.
- Technologies of instruction should be designed to increase, not reduce, the amount of personal contact between teacher and learner (p. 19).

Perhaps the most valuable experience of this project was to see how educators in college, community and school district adult learning programs have adapted the various ILSs to meet their learners' needs by incorporating many of the above principles into their program. All of the ILSs reviewed did provide teachers with a platform to bring late 20th century tools to the classroom.

However, all of these commercial ILSs have so far failed to provide an informatics curriculum; that is "a list of fundamental skills for the new hypermedia literacy" (Lemke 1993). These skills include database exploration, information search and retrieval and other user skills, as well as authoring skills. With the world's information base becoming broader and deeper at an exponential rate, database exploration will be a critical skill in an environment where "students will frequently be expected to change from one area of work to another and quickly 'catch up' with its problems and issues." Beyond awareness of the wealth of information available on the Internet are the electronic/Internet skills necessary to locate and retrieve a specific, identified, bit of information. Once information is retrieved the learner will need skills in reading hypermedia. Just as the printing press brought about the demand for a new range of skills, so too will hypermedia.

One group that is taking advantage of information age educational opportunities is the business and consumer community. The fastest growing segment of the software business is now the home education market. According to the Software Publishers Association home education software sales for the first three quarters of 1993 were up 46% from the same period in 1992, outpacing all other categories except databases (*The Heller Report*, 1/94, p.11).

Certainly the systems reviewed are big business. The CCC system is owned by Paramount, the entertainment giant, who in turn was recently bought out by Viacom, the cable and telecommunications conglomerate. Another American owned system, Jostens Learning Corporation of San Diego, saw revenues of $172 million in the fiscal year 1992, up 7.5% from the previous year. In August 1993, Jostens purchased Wicat Systems Inc., another ILS developer, for $102 million. This gives them a more than 60% share of the market for ILSs in the United States (*VAR Business*, Nov. 15, 1993, p. 31). All of the active ILS developers the project team reported on either offer or will shortly offer scaled down versions of their product. At the moment pricing is still too high to appeal to the average consumer. However the above statistics and economies of scale would indicate that consumer versions of these systems will surely be in the marketplace soon. In fact, if an ILS is taken to its logical extension, there is no reason why education could not be offered more efficiently, practically and economically in cyberspace; for example, in homes and private learning centres.

These ILSs may soon have competition, however. Microsoft CEO Bill Gates predicts that by the end of the decade, 50% of his company's revenues will come from home sales -- a ten-fold increase from the current level of activity. (*Fortune* 2/21/94 p.101). Telephone and cable companies are also getting into the act. Nynex announced plans for a $2.8 billion interactive network that could link up to two million homes and businesses in the Northeast by 1996. Nynex joins Pacific Telesis, US West and Bell Atlantic, which have all announced aggressive plans for interactive networks in their territories. (*Wall Street Journal* 2/11/94 A4). In Canada, Rogers of Cantel, Unitel and cablevision fame, is pursuing similar aims.

The research on how the next generation of ILSs can be used to improve learning in colleges, institutes and schools is clear. These emerging technologies have the potential to be even more liberating than the printing press was for the forebears of today's learners and instructors.

Footnote

The recently dated (February 1994) information cited in the above text and below was gained via the Internet in one fifteen minute session. Internet connections either currently are or shortly will be available to all public educators. For more information contact the Standing Committee on Education Technology (colleges and institutes) or the Educational Technology Centre (public schools). Others are gaining access to the Internet thanks to the volunteer activities of Freenets throughout the province and around the world.

The following are two examples of the myriad of services and information provided via the Internet. They are free of charge to any who are able to make the connection and decipher the instructions.

1. **EDUCOM** -- Transforming Education Through Information Technology

EDUCOM REVIEW GOES ON ELECTRONIC NEWSSTAND. The text of Educom Review, a bimonthly magazine about learning, communications and information technology, will now be available electronically on The Electronic Newsstand (internet.com), an electronic magazine subscription service that also features such national magazines as The New Yorker and The New Republic. (The print version of the latest Educom Review is now in the mail to subscribers.)

EDUCOM UPDATE. The EDUCOM Update is a twice-a-month electronic information service covering news about Educom, its member institutions, its corporate affiliates, and other organizations that share Educom's goals for transforming education through information technology. To subscribe, send mail to listproc@educom.edu with the message SUB UPDATE <yourfirstname yourlastname>. To submit news about your organization, send a very brief message to info@educom.edu.

2. **EDUPAGE**.

EDUPAGE, a twice-weekly summary of news items on information technology, is provided as a service by EDUCOM -- a consortium of leading colleges and universities seeking to transform education through the use of information technology.

To subscribe to Edupage send e-mail to listproc@educom.edu, containing the following text: SUB EDUPAGE yourfirstname yourlastname. To unsubscribe, send e-mail containing the text: UNSUB EDUPAGE. To send comments about Edupage, send mail to comments@educom.edu. Back issues of Edupage are available by WAIS, Gopher, and anonymous ftp from educom.edu. [NOTE: Edupage is now distributed in Spanish and Portuguese translations, courtesy of RNP, a project of the Brazilian National Research Council. For info: edunews@nc-rj.rnp.br].

REFERENCES

Alberta Career Development and Employment, Policy and Research Division. (1992). *A comparison of computer assisted instruction systems* [for remote, northern communities and mobile industry training centres]. Edmonton, AB: Author.

Bizzocchi, J., Bruce, R. and Quinlan, M. (1991). *Electronic communication systems: An assessment of the current status at B.C. colleges and institutions.* Victoria, B.C. The Standing Committee on Educational Technology (SCOET).

Computers in Literacy Committee. (1990). *Position paper on the use of computers in adult literacy.* Toronto: The Metro Toronto Movement for Literacy.

Crowley, M.L. (1994). *Guidelines and support materials for the acquisition of computer-based adult literacy systems.* Ottawa: National Literacy Secretariat.

Dede, C. (1989). The Evolution of Information Technology: Implications for Curriculum. *Educational Leadership*, 47, (1), 23-26.

Department of Advanced Education and Labour, Program Coordination and Apprenticeship Training. (1993). *Results of the evaluation of Autoskill software.* Fredericton, N.B.: Author.

Evans, P., Falconer, L., Groves, J. and Kubin, D. (1988). *An evaluation of the PALS computer-based adult literacy program in the Saanich School District.* University of Victoria, Faculty of Education. (Report available from School District 63, Saanich, B.C.)

Fahy, P.J. (1987). *PLATO Computer-Managed Learning Report*. Summative Evaluation of PLATO Computer-Managed Learning in the Nursing Assistant Program. Alberta Vocational Centre, Edmonton. (ERIC Document Reproduction Service Number ED 283 043).

Fahy, P. (1988). *Keewatin Regional Educational Authority pilot adult education project: Computer-assisted learning.* Year one report. Edmonton: Alberta Vocational Centre. (ERIC Document Reproduction Service Number ED 298 297).

Fahy, P.J. (1991). *Adult literacy learning and computer technology: Features of effective computer-assisted learning systems.* A paper presented at the Alberta Association for Adult Literacy Annual Conference, Lethbridge, Nov. 22, 1991. (Available through ERIC Document Reproduction Service.)

Fawson, E.C. and Smellie, D.C. (1990). Technology Transfer: A model for public education. *Educational Technology*, April, pp. 19-25.

Friesen, V.R. (1991). *A critique of computer-managed institution in the light of key principles of adult education*. Unpublished Master's thesis, Simon Fraser University, Burnaby, B.C.

Hammond-Kaarremaa, L. (1992). *The issues affecting the implementation and use of educational technology*. Victoria, B.C.: The Standing Committee on Educational Technology (SCOET).

Illich, I. (1971). *Deschooling Society*. New York: Harper & Row.

Imel, S. (1988). *Computer-assisted instruction in adult literacy education. Practice application brief.* ERIC Clearinghouse on Adult, Career, and Vocational Education. (ERIC Document Reproduction Service No. ED 296 184).

Knappler, C. (1988). Technology and Lifelong Learning. In D. Boud (Ed.), *Developing student autonomy in learning*. New York: Nichols Pub. Co.

Lemke, J.L. (1993). Hypermedia and higher education. *Interpersonal Communication and Technology* (IPCT-L@GUVM), April (1993).

Rachal, J. (1993). Computer-assisted instruction in adult basic and secondary education: A review of the experimental literature, 1984-1992. *Adult Education Quarterly, 43 (3), 165-172.*

Rigg, P. (1993). *The years past, the years ahead.* Available from: School District #56 (Nechako), Vanderhoof, B.C.

Rivers and Associates. (1992). *The ABE research project - Adult basic education in British Columbia.* Prepared for the Human Resource Development Project, Ministry of Advanced Education, Training and Technology, Victoria, B.C.: Centre for Curriculum and Professional Development.

Seaman, D.F. and McCallister, J.M. (1988). *An evaluation of computer-assisted instructional systems used to deliver literacy services for JTPA participants at Houston Community College.* Texas A and M University: Texas Center for Adult Literacy and Learning. (ERIC Document Reproduction Service Number ED 311 226).

Sherry, M. (1990). An EPIE institute report: Integrated instructional systems. *T.H.E. Journal*, September, 86-89.

Standing Committee on Educational Technology. (1993). *Educational technology: A building block for the future.* B.C. College and Institutes, Victoria, B.C.: Author.

Sylvestre, K. and Lewis, J. (1993). *Computer-assisted learning systems: Evaluation report.* Sorrento Systems Inc.

Thomas, A.M. (1990). *Literature review.* Canadian Education Association, Computer Software for Literacy Project. (Report available through National Literacy Secretariat.)

Tremblay, E. (1992). *Results of the longitudinal evaluation of the CCC instructional system.* Fredericton, N.B.: Department of Advanced Education and Labour, Program Coordination and Apprenticeship Training Branch.

Turner, T.C. and Stockdill, S.H. (Eds.) (1987). *The technology for literacy project evaluation. A special report from the Donor Review Board.* St. Paul, MN: St. Paul Foundation. (ERIC Document Reproduction Service Number ED 295 028).

Turner, T.C. (1988). An overview of computers in adult literacy programs. *Lifelong Learning, 11(8):9-12.*

Watkins, D. and Goudie, B. (1991). *Comparative study of the PLATO CMI computer system and the [Computer] Curriculum Corporation Microhost System.* Happy Valley - Goose Bay, Nfd.: Labrador Community College.

Wellburn, E. (1992). *Current issues regarding integrated learning systems.* Occasional Paper. Sidney, B.C.: Education Technology Centre of British Columbia.

Wilson, A.M. (1992). *The INVEST Program - A computer-based system for adult academic upgrading: A pilot project.* (Available from Centre for Learning Assistance and Research, Department of Education, Mount Allison University, Sackville, New Brunswick.)

Wolter-Mullen, H. (1989). *Final report of Keewatin Regional Education Authority pilot education project: Computer-assisted learning adult education Keewatin Region.* Arctic College, Keewatin Campus, N.W.T.

Wright, B.E.W. (Ed.) (1993). *Software Buyers' Guide* (1993 ed.). Seattle: Northwest Regional Literacy Resource Centre (NRLRC).

APPENDIX A

GUIDELINES
FOR THE ACQUISITION OF
COMPUTER-BASED ADULT LITERACY SYSTEMS

Developed by

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Under a grant from

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GUIDELINES
FOR THE ACQUISITION OF
COMPUTER-BASED ADULT LITERACY SYSTEMS

The choice of software for literacy programs should be guided not only by the specific evaluative criteria...but also by the considerations which generally govern the use of other learning materials. (Audrey Thomas)

Purpose of these guidelines:

Deciding whether or not to introduce a computer-based system into an adult literacy program is a multi-faceted process. A wide range of issues need to be considered. These include pedagogical concerns: Does the approach used by the technology support the educational goals and philosophy of the unit? What changes occur in classroom practices? What will be the effects on the learners? These include issues of cost: Is the expense (often very high) worth it? These include issues of support: If we run into trouble, who is there to help us?

The guidelines which follow are intended to assist potential purchasers **as they consider the acquisition** of a computer-based adult literacy system. Seven areas which influence decision-making are identified, a series of questions pertaining to each area is presented, and, on the final page of the guidelines, a summary of the responses to each section is requested. For ease of reference, it is also recommended that the section below be completed.

SYSTEM:

EVALUATOR(S): ______________________________

____

DATE: ______________________________

FINAL RECOMMENDATION: Purchase______ Do **NOT** Purchase ________

Obtaining information with which to answer the questions:

There are two broad areas for consideration when purchasing a system. These are the issues relating to the delivery system (e.g., type of computers, costs) and the issues of pedagogy (e.g., what can the system do? how well does it do it?). Questions dealing with the first area are normally answered in a factual way, i.e. to operate, this system requires computer X, with memory size Y. The vendor is usually the most reliable source of accurate information concerning these questions.

For questions of pedagogy, however, it is usually best to ask people who are already using the materials for their reactions. This can include yourself! Ask the vendor if you can have the materials on a trial basis. This allows you to use the system with the staff and the students for whom it is intended. The appropriateness of the material for the relevant audience can then be assessed first-hand. As vendors, however, are sometimes reluctant to provide expensive systems for a trial run, the next best approach is to talk with learning centres and individuals who are using the material in which you are interested. (References to users of each system are provided in the Appendix. The vendor should also be able to provide you with a list of users.) In order to obtain a full picture of what a system has to offer, you should talk to those who have had successful, and unsuccessful, experiences with the materials. Given the large expenditure usually involved with the purchase of a system, the cost of several long distance phone calls is probably a good investment.

When direct contact with users of the system is impossible, read evaluation reports of the system under consideration. While not as valuable as talking directly with someone familiar with the system, these reports usually address many of the issues of interest to purchasers. In particular, these reports frequently comment on the effectiveness of the system in a specific environment, and on long-term effects such as the retention of skills by the learner. (A list of sources for such reports is found in the Appendix. The vendor should also be able to provide you with this type of information.)

It may be possible, however, that you will be unable to follow any of the suggestions above. In that case, you should ask the vendor to provide you with answers to your questions. A word of caution, however...remember that the vendor's job is to SELL the system. Don't be blinded by the bells and whistles the system provides. Does the system meet **your** needs? Is the expenditure **worth** the returns? Could you spend the same amount of money, or less, in another way to get equivalent results? (Item 18 in the Appendix provides an interesting set of scenarios to use when working with a vendor.)

Using the criteria:

Review all the questions in the guidelines first. This will acquaint you with the scope of the suggested questioning. Then decide which questions are significant for your situation. You can also consider the sections in any order. If, for example, you wish to address issues relating to content first, start with Section C, Compatibility with Program.

It is strongly recommended that the instructors whose students will be using the materials participate in the evaluation process. Indeed, using an evaluation team consisting of various experts -- curriculum developers, instructors, students, and computer specialists -- will probably result in a truly informed decision being made.

Terminology:

An **Integrated Learning System (ILS)** is an interconnection of computer hardware and software which offers instructional materials and programs to users within a sophisticated management framework. Typically, an ILS uses a network of computers or terminals to teach course content. This material covers a major portion of the mathematics/science and language arts/social science curricula, spanning several grades or levels. An ILS also monitors and reports student performance and, based on those findings, prescribes learning paths.

When either the instructional or management function dominates, other terms are sometimes applied. **Computer Assisted Instruction (CAI)** refers to using the computer for teaching curricular content. Often materials labelled CAI cover a restricted curriculum area and grade level and use a drill and practice/tutorial delivery format. **Computer-Managed Instruction (CMI)** refers to using the computer for managing or tracking students' progress, often with the aid of on-line testing. The instructional materials, however, are not necessarily presented on the computer. Sometimes CMI also has the ability to recommend, based on student performance, a "further" set or sequence of instructional materials.

These *Guidelines* are designed to reflect the full range of concerns associated with the purchase of an Integrated Learning System for instruction in the adult literacy field.

A. EQUIPMENT

(This section refers to the specifications of the actual computer equipment needed to operate the integrated learning system effectively and efficiently. It asks you to consider just how the hardware needs of the system can be met with your existing computers, if you have any, and what additional equipment you will need.)

1. Can this system:
    a. be used on a single personal computer?
    b. be networked with other computers? (If YES, what additional memory is required?)

2. What computer (and memory) is required to operate this system:
    a. at present?
    b. in projected releases?

3. A variety of accessories (peripherals) are often associated with delivering computer-based literacy instruction. These include a speech card, a modem, a cd-rom, a video disk player, headphones, microphones, touch screen. For this system, which peripherals are:
    a. required?
    b. optional?
    c. provided?

4. How do the requirements of this system fit with what we already have, i.e., can I use my current:
    a. computers?
    b. monitors (colour?)
    c. printers?
    d. keyboards?
    e. modems?
    f. space for equipment?
    g. print materials/books?
    h. other considerations?

5. Can this system be used from a distant site:
    a. by students to access lessons?
    b. by instructors to access management systems?

Record a summary of this section on the last page, keeping in mind the relevance of the information to your situation.

B. COST, INSTALLING, AND LICENSING

(As is true with most major purchases, the costs depend upon how elaborate or how basic a system is required to meet your needs. This section is designed to help you determine the cost of the system you want and precisely what you will be getting for your money.)

1. What is the total purchase price for a complete system?

2. What is included in this price:
   a. disks?
   b. hardware?
   c. networking software?
   d. installation?
   e. shipping?
   f. initial training?
   g. on-going curriculum development sessions?
   h. printed materials required for printing and operation?
   i. updated versions of print and computer based materials?
   j. maintenance (are various schedules available)?
   k. warranty (what is covered by this)?
   l. telephone/FAX (800) help-line?
   m. other features?

3. a. What is the cost of those items in question 2 which are not included in the purchase price?
   b. Are these costs one-time or on-going?

4. a. How many work-stations can this system support?
   b. What is the cost per work-station?
   c. In what way does the unit cost decrease when multiple work-stations are purchased?

5. What discounts are possible:
   a. on the initial purchase?
   b. on future purchases?

6. What issues are associated with starting to use the system:
   a. once purchased, how long will it take to deliver the system?
   b. what are the layout/physical plant requirements?
   c. what are the electrical wiring requirements?
   d. what are the phone requirements (e.g. wiring, touch-tone)?
   e. how easy is the system to install?
   f. how long does it take to install the system?
   g. who is responsible for installation (e.g. the vendor, the manufacturer, the purchaser)?
   h. what is the delivery time for the required print materials?
   i. how easy is it to enter preliminary student data in order for them to start using the system?
   j. how long does it take for instructors/aides/students to learn to use the system?
   k. other?

7. What are the details of the licensing arrangements:
   a. what can be copied or transferred?
   b. is there a restriction on the number of stations that can be used simultaneously with the system?
   c. can the system be merged with other computer packages (e.g. word processing software, graphics software, spreadsheets)?
   d. what are the other licensing arrangements?

Record a summary of this section on the last page, keeping in mind the relevance of the information to your situation.

C. COMPATIBILITY WITH PROGRAM

(Integrated Learning Systems are seldom used by adult educators as the exclusive mode of instruction. Normally, they are meant to supplement more traditional teaching. This section is designed to help you determine the degree to which the system fits with your beliefs and practices about teaching and learning.)

1. How does the instructional content fit with our literacy program:
   a. What curriculum areas are included?
   b. Is the content relevant to our goals? (How well does it match?)
   c. This system is compatible with which principles of learning (e.g. whole language, phonics, outcomes based)? List some examples which support your answer to the previous question.
   d. What are the strong areas in the instructional content of the system?
   e. What are the weak areas in the instructional content of the system?
   f. Does the system serve as the dominant means of instruction or as an adjunct to the program?
   g. Does the learner use the system independently of the instructor/tutor?

2. What skills for learning are developed by the system (e.g. predicting, summarizing, paraphrasing)?

3. Could the same teaching/learning objectives be met in other, more cost-effective and efficient, ways?

4. What pre-requisite skills are required to use the system?
   a. reading levels of student?
   b. content skills?
   c. computer skills (e.g. keyboarding, familiarization with the system):
      (i) for the student?
      (ii) for the instructor?

5. Is the learning material:
   a. oriented towards adults?
   b. written in clear language?
   c. free from bias and stereotyping?
   d. culturally sensitive?
   e. Canadian content?
   f. of potential interest to your students?

6. What support materials:
   a. are required?
   b. are provided with the system?

7. What initial and on-going training of instructors is required?

8. Does this system require a technical support person to be present while students are working on the computer?

9. a. How long does it typically take a student to complete one lesson?
   b. Can the lesson be accommodated in our timetable?

10. How can this material be used with our students who are physically challenged? (If special adaptive features are required, are they available?, included?)

11. How can this material be used with our students who have learning disabilities? (If special adaptive features are required, are they available?, included?)

12. a. Can this material be used with students whose first language is not English?
    b. In what languages other than English is this material available?

Record a summary of this section on the last page, keeping in mind the relevance of the information to your situation.

D. FLEXIBILITY

(Adult educators regularly structure literacy programs to meet the needs of individual learners. This section is designed to help you determine just how flexible the computer-based system is likely to be so that your students' individual needs are accommodated.)

1. Can the student alter the pace and sequence of the program (e.g. skip to a new topic if the current one is familiar, go to remedial material as needed)?

2. To what extent is the student's progress through the material directed by
   a. the instructor?
   b. the student?
   c. the system?

3. a. Can the instructor change existing content and/or add content?
   b. If yes, how easily can this be done (e.g. time required, technical skills required)?
   c. Can the instructor change or add tests/evaluations?
   d. If yes, how easily can this be done (e.g. time required, technical skills required)?
   e. Can the instructor regulate parameters (e.g. percentage correct needed for mastery, number of chances to answer correctly)?

4. Can adaptations be made to:
   a. print size on screen?
   b. audio (e.g. turn sound off, change voice)?
   c. other features?

5. How does the learner enter/re-enter the program (e.g. same place each time, select own starting point, computer controlled, instructor controlled)?

Record a summary of this section on the last page, keeping in mind the relevance of the information to your situation.

E. MANAGEMENT

(Integrated Learning Systems ordinarily allow the instructor to monitor, record, and report student progress. This section is intended to help you determine these and other types of management potential available with the system.)

1. Does the system:
   a. accept correct answers in a variety of forms?
   b. give students a reasonable number of chances to answer correctly?
   c. provide useful help where appropriate?
   d. re-teach the lesson in another way if the student answers incorrectly several times?

2. Are the responses students receive for their work appropriate (e.g. positive, adult, immediate, constructive, not boring, not annoying) when:
   a. on-screen?
   b. aural?
   c. printed-out?

3. Will the computer-based activities provide our students sufficient opportunity to practice the skill or concept to ensure a reasonable chance for success?

4. a. How does the system evaluate a student's success/progress with the material?
   b. Are the criteria used for success appropriate for our students?
   c. Can the criteria be modified by the instructor (e.g. pass rate changed from 75% to 85%)?

5. Are useful diagnostic evaluations provided where appropriate:
   a. to students?
   b. to instructors?

6. Can students print a copy of their work?

7. What information on test performance (e.g. scores, number of problems attempted) is provided/available:
   a. to students?
   b. to instructors?

8. When/where is information on test performance provided (e.g. on screen at end of test session, stored for future retrieval)?

9. Does the system provide information on "time" variables (e.g. time a student spends per computer session, time it takes to complete a unit, etc.)?

10. What security features exist (e.g. back-up systems, limited access to records, protection against 'infected' programs)?

Record a summary of this section on the last page, keeping in mind the relevance of the information to your situation.

F. DOCUMENTATION AND SUPPORT

(Materials designed to enable you to deal with the operational aspects are typically available with Integrated Learning Systems. This section alerts you to questions that will help you determine the nature and extent of support documents and services.)

1. a. What kind of documentation is provided for the students' use?
   b. Is it easily understood?
   c. Is it comprehensive?

2. a. What is the nature and quality of the documentation provided for the instructor's use?
   b. Is it easily understood?
   c. Is it comprehensive?

3. What supports does the vendor offer after installation?

4. Is there a (24 hour toll-free) telephone/FAX help line?

5. What new features (including updates) are being considered for the system?

6. If there are new features, will the vendor supply these free of charge?

7. If there is a "user-group" for this system, how do I contact it?

Record a summary of this section on the last page, keeping in mind the relevance of the information to your situation.

G. FURTHER INFORMATION

(Issues concerning "in-course"and long-term evaluations of the system and the reliability of the developer and distributer of the system are addressed in this final section.)

1. What do reviews and field testing evaluations say about this system? (e.g., ease of use, target group, retention of learning, transferability of skills, student attitudes)?

2. Who else in the region is using this system?

3. Who developed the instructional materials?

4. How reputable is the manufacturer (e.g., well known for educational materials)?

5. How reputable is the distributor (e.g., prompt and helpful?)

PURCHASING RECOMMENDATION

RATING: This can be done through a text summary and/or by numerical weightings. If relative weightings are given to each section of the Guidelines, each user should determine these by taking into consideration his or her unique situation. For example, if you have access to several highly competent computer technicians, the external support available may not be a crucial factor in making your decision; whereas, if such technicians are not available locally, support service might take on a higher weighting. In any event, the Guidelines consist of inter-dependent parts, and the weighting given to each will have to be determined by individual organizations.

______A. EQUIPMENT

______B. COST, INSTALLING, AND LICENSING

______C. COMPATIBILITY WITH PROGRAM

______D. FLEXIBILITY

______E. MANAGEMENT

______F. DOCUMENTATION AND SUPPORT

______G. FURTHER INFORMATION

FINAL RECOMMENDATION: Purchase ________ Do NOT Purchase ________

APPENDIX B

INTEGRATED LEARNING SYSTEM (ILS) ANALYSIS

1. Brief Overview of the ILSs
2. ILS Analysis by Users (Twenty Interviewees)

APPENDIX B

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The tables in this Appendix are grouped according to like items. They reflect the opinions of users for five of the systems in answer to Part C of the Instructors' Interview Schedule which had fifty statements for comment. For reasons explained in the text - p. 19 - PALS is excluded from this analysis. The samples are small but reflect the current experience of those users. (It was impossible to interview all users of widely distributed systems, and other systems only have a few users.) The scores should be interpreted as *indicators* of probable strengths and weaknesses of the systems based on use *to date*.

The average or mean scores of responses have been worked out for respondents of each system. The scale was 1 to 5 where "1" represented "always" and "5" represented "never". The lower the mean score, therefore, the more consistent is the ILS perceived to be by users for that item. The highest mean scores indicate that the ILS is perceived to be less consistent in performance - there may be gaps, or other issues in use. A mid- or higher score may also reflect a divergent range of responses from users depending on their experience and use of the ILS in their particular setting.

Autoskill

Autoskill International Inc. has its headquarters in Ottawa, Ontario. The company claims its "Component Reading Subskills (CRS) program is a computerized skills-oriented learning resource that develops the skills needed for the mastery of reading." A second component is the Autoskill Mathematics Program, "a computerized, curriculum-based learning resource aimed at promoting the acquisition of skills necessary for the mastery of mathematics in an easy-to-learn manner." Both networked and standalone versions of the math and reading programs are available individually for MAC or MS-DOS hardware platforms. A French version of the company's reading program is also available for MS-DOS.

For more information contact the British Columbia representative:

Ruth Woodcock
Autoskills Enterprises B.C. Inc.
Nanaimo, BC
Phone (604) 756-7713
FAX (604) 756-4629

CCC

The Computer Curriculum Corporation (CCC), an American-based Paramount Communications Company, is represented in Canada by Columbia Learning Systems of Calgary, Alberta. CCC has renamed its Integrated Learning System "SuccessMaker". The company claims this product is an "educational resource tool that helps facilitators help students learn Mathematics, Science, Reading, Language Arts, Writing Skills and Employment Issues." Both standalone and networked versions make use of "live video, animation, graphics and digitized sound". It is the only system to run under MS-Windows as well as the MAC. The company has plans to market individual components of the above in addition to the complete package.

For more information contact the British Columbia representative:

Matt J. White
Manager Pacific/Northern
Columbia Learning Systems
Victoria, BC
Phone (604) 744-3816
FAX (604) 744-3815

Jostens

INVEST, the ILS of Jostens Learning Corporation of San Diego, "begins at the foundation level of literacy skills and continues through GED preparation." The system's computer lessons use a variety of features "including interactive graphics, sound, differential feedback, branching, review/hint screens, vocabulary windows and on-screen calculators" to cover "reading/vocabulary building, language experience and writing skills, and mathematical/computational skills." Its standalone and networked systems are available for both MAC and MS-DOS. The standalone MS-DOS CD-ROM based system will only work with certain CD-ROM drives. Jostens is in the process of unbundling its system to make individual components available.

For more information contact the British Columbia representative:

Grant Burson
WestGroup - Western Educational Systems and Technologies
Victoria, BC
Phone (604) 477-8809
FAX (604) 477-5241

Pathfinder

The Pathfinder Learning System of Toronto, Ontario is a Computer Managed Learning System. The computer is used to present students with pre and post-tests. Based on the results of each test, the student is directed to off-line curriculum resources; predominantly print, but with some video, audio and software. Topics available include Reading and Writing, Social Studies, Mathematics, General Science and Employment Life Skills. If the programmable version of the management system is purchased, curriculum "paths, strands, topics, objectives and outcomes" can be customized to meet individual site needs. A British Columbia consortium of secondary teachers from across the province is developing paths to parallel the Ministry of Education curriculum. The company also plans to offer an unbundled version of its software, including a standalone version as well as the current networked version.

For more information contact the British Columbia representative:

Tanya Northcott
Pathfinder Learning Systems Corporation
New Westminster, BC
Phone (604) 521-1664
FAX (604) 521-6363

PLATO

The Roach Organization (TRO) of Edina, Minnesota, claim that its product, the PLATO System, "has been at the forefront of instructional technology for more than twenty years". The company states its courseware "can meet the needs of a wide range of learner populations within any educational environment." Topics included Basic and Advanced Literacy Skills, Life Skills, Intermediate and Advanced Mathematics, Physical Science and Computer Science. The system's courseware "can be presented as published or restructured to correspond to specific program or teaching strategies." TRO is just completing a "total redesign" of the core PLATO curricula with a new user interface and other improvements. The system will be renamed PLATO 2000+. The company also has plans to add audio and other multimedia features to the system. PLATO is available in standalone and networked versions.

For more information contact the British Columbia representative:

Grant E. Bishop
Account Manager
TRO Learning (Canada) Inc.
Vancouver, BC
Phone (604) 432-7115
FAX (604) 431-9213

Table B.1

Approach to Learners

Type of System (Number Surveyed)	(1) Requires Active Learner Participation	(2) Allows Variety of Learning Styles	(3) Allows Learning at Different Rates	(4) Encourages Learning as an Individual Process	(5) Encourages Learning as a Social Process	(7) Meets Many Diverse Needs	(35) Is Simple for Students to Use
Autoskill (5)	1.0	1.8	1.0	1.0	4.4	2.6	1.8
CCC (3)	1.0	2.0	1.3	1.0	3.7	1.7	1.0
Jostens (3)	1.3	2.3	1.0	1.0	2.3	1.3	1.7
Pathfinder (6)	2.0	3.0	1.2	1.2	3.3	2.7	1.8
PLATO (3)	1.7	3.0	1.0	2.0	4.3	2.3	2.0

Table B.2

Instructor Use and Record-Keeping

Type of System (Number Surveyed)	(36) Is Simple for Instructors to Use	(9) Relieves Instructor of Classroom Management Responsibilities	(32) Provides Instructors with Reports on Curricula and Student Progress	(33) Allows Instructors to Develop Customized Reports	(34) Allows Instructors to Export Data to Other Databases
Autoskill (5)	2.4	2.8	1.2	2.8	5.0
CCC (3)	1.0	2.3	1.0	1.0	N/A
Jostens (3)	1.3	1.7	1.0	4.0	5.0
Pathfinder (6)	2.3	2.5	1.0	2.2	3.5
PLATO (3)	1.7	1.7	1.7	3.3	4.0

Table B.3

Data Management

	(31)	(30)	(44)	(43)
Type of System (Number Surveyed)	Allows Instructors to Author Curriculum	Allows Instructors to Use Courseware From Other Sources	Allows Easy Integration of Other LAN Applications	Provides Easy to Use Tape Back-up
Autoskill (5)	3.6	5.0	4.2	4.0
CCC (3)	3.0	3.0	3.5	1.0
Jostens (3)	5.0	2.3	3.0	2.0
Pathfinder (6)	1.5	1.5	2.2	1.3
PLATO (3)	2.3	5.0	4.5	2.3

Table B.4

Curriculum Design

	(18)	(26)	(27)	(28)	(29)	(38)
Type of System (Number Surveyed)	Offers Competency-based Curriculum	Curriculum is Modularized	Provides a Variety of Instructional Strategies	Allows Learners to Control Time on Task	Allows Students Choice of Topics	Allows for Bookmarking
Autoskill (5)	1.0	1.0	3.0	2.2	2.2	1.0
CCC (3)	1.5	1.7	1.3	2.3	2.0	1.3
Jostens (3)	1.0	1.3	1.3	1.0	1.3	2.3
Pathfinder (6)	1.5	1.2	3.0	1.2	2.7	1.2
PLATO (3)	1.0	1.0	1.3	1.0	1.7	1.0

Table B.5

Curriculum Fit with BC ABE Framework

Type of System (Number Surveyed)	(12) Meets Fundamental Requirements	(13) Meets GED Requirements	(14) Meets Intermediate Requirements	(15) Meets Advanced Requirements	(16) Meets Provincial Requirements
Autoskill (5)	1.4	4.3	3.5	4.5	4.5
CCC (3)	1.0	2.0	2.7	3.3	4.7
Jostens (3)	1.3	1.3	1.0	4.5	5.0
Pathfinder (6)	1.8	1.8	1.8	2.6	2.5
PLATO (3)	1.3	1.3	1.0	3.0	3.3

Table B.6

Curriculum Support

Type of System (Number Surveyed)	(17) Offers Specialized Topics Outside Core Curricula	(19) Uses Off-line Materials as Essential Complements	(20) Uses Off-line Materials as Supplements	(21) Allows Instructors to Integrate Own Curriculum
Autoskill (5)	4.6	5.0	4.4	3.4
CCC (3)	1.3	4.0	2.7	3.0
Jostens (3)	2.7	3.0	1.7	3.3
Pathfinder (6)	3.0	1.0	3.2	1.3
PLATO (3)	3.7	3.0	2.3	3.7

Table B.7

Courseware Sensitivity

Type of System (Number Surveyed)	(10) Provides Canadian Content	(11) Is Culturally Sensitive	(22) Makes Appropriate (Adult) Use of Graphics
Autoskill (5)	2.2	3.0	2.4
CCC (3)	4.0	1.7	2.3
Jostens (3)	4.7	2.0	1.3
Pathfinder (6)	1.8	2.8	2.5
PLATO (3)	2.7	2.0	2.7

Table B.8

System Reliability

Type of System (Number Surveyed)	(23) Hardware is Reliable	(24) Software is Reliable	(25) Courseware Curricula is Reliable	(37) Provides Adequate Security
Autoskill (5)	1.5	2.0	2.2	1.6
CCC (3)	2.0	1.7	1.7	1.0
Jostens (3)	1.3	1.3	2.3	1.5
Pathfinder (6)	2.0	2.3	2.5	1.5
PLATO (3)	2.0	1.7	2.0	1.0

Table B.9

Electronic Communication

	(6)	(8)	(45)
Type of System (Number Surveyed)	Provides Access to Networks and Information Outside the Classroom	Provides Access to the Internet	Allows Students Easy Access by Modem
Autoskill (5)	4.4	5.0	5.0
CCC (3)	4.5	5.0	5.0
Jostens (3)	5.0	5.0	3.7
Pathfinder (6)	4.0	5.0	5.0
PLATO (3)	4.7	5.0	4.0

Table B.10

System Training and Support

	(41)	(42)	(40)	(39)
Type of System (Number Surveyed)	Offered Effective Initial Training	Offers Useful Ongoing Training	Offers Helpful Toll-Free Support	Has Arranged for Good Local Hardware Support
Autoskill (5)	3.0	3.8	1.8	2.8
CCC (3)	1.0	2.0	1.0	N/A
Jostens (3)	3.0	2.3	1.3	3.0
Pathfinder (6)	1.8	3.5	1.7	2.7
PLATO (3)	1.7	3.3	1.3	3.0

Table B.11

Vendors' Commitment to Professional Development

	(46)	(47)	(48)	(49)	(50)
Type of System (Number Surveyed)	Offers Educational Expertise and Experience Beyond Sales and Technical	Provides Informative Newsletters	Offers a Viable Users' Group Network	Provides Helpful Company Sponsored Support Activities	Provides Impartial Product Reviews
Autoskill (5)	4.0	4.8	5.0	4.8	4.0
CCC (3)	4.5	4.5	4.0	4.0	3.5
Jostens (3)	3.0	3.0	4.3	5.0	5.0
Pathfinder (6)	3.5	2.5	2.5	2.8	3.6
PLATO (3)	2.7	3.3	4.0	4.7	3.0

Table B.12

Stand-Alone Configuration and Costs (IBM/MS-DOS Compatible)

	Autoskill	**CCC**	**Jostens**	**Pathfinder**	**PLATO**
Date	Jan/94	Sept/94	Feb/94	Jan/94	Jan/94
Hardware Configuration	IBM/MS-DOS Compatible 286 or higher w/640K RAM, 1.44 MB 3.5" drive, DOS 4.0 or better, mouse, keyboard, 40MB hard drive, color monitor (recommended).	IBM/MS-DOS Compatible 486SX or higher w/4MB RAM, (8MB recommended) 1.44 MB 3.5" drive, DOS 5.0, mouse, keyboard, 200 MB hard drive, .28 SVGA monitor, Sound Blaster sound card.	IBM 486SX/25 MHz w/4MB RAM, 1.44 MB 3.5" drive, DOS 5.0, mouse, keyboard, 214MB hard drive, .28 SVGA monitor, Digispeech Adapter & Head Set, Texel CD player, Modem/Software.	Standalone currently under development. Will be available later in the year.	IBM/MS-DOS Compatible 486SX 25 (minimum 286, 12 MHz) w/4MB RAM (minimum 2MB) 1.44 MB 3.5" drive, DOS 5.0 or higher, keyboard, 150MB hard drive (minimum 40 MB), VGA colour monitor, internal CD-ROM drive (minimum 330 msec access time).
Hardware Cost	Not available.	Not available.	$4,141	N/A	$2,690
Software	Reading and Math (also sold separately at $1,495 each; French also available at same price).	Complete package covers Math, Science, Reading and Writing. Also includes one CD-ROM drive, headset and publications package as well as the following services: Training and installation (3 days), hot line support, annual courseware fee and brokerage fee.	Instructional courseware with three tiers of learning in Reading, Writing & Math. Includes software installation, management and instructional software.		Comprehensive Literacy Skills including Basic Skills Math, Reading and Language Arts and Advanced Literacy Skills Math, Reading, Writing, Science, Social Studies and Computer Awareness as well as Life Coping Skills.
Software Cost	$2,990	$14,927	$4,500	N/A	$5,525
Remote Access Configuration	Not available.	Not available.	14,400 Modem, Software (Host/ Remote). Allows vendor to provide support by controlling the computer over the phone line to a remote location. At the moment is not being used for student access.		Not available.

Table B.12 (continued)

	Autoskill	CCC	Jostens	Pathfinder	PLATO
Remote Access Cost			Included		
Annual Support Services Site Licence	Support is free. No site licence at this time. There may be additional costs for major software upgrades.	First year included with system. At the beginning of the second and succeeding years the recurring cost is $1,950.	First year support services includes software enhancements, remote diagnostics, toll free help-line and consumable supplies for 10 students. $660.		Included in the price is toll free support and software upgrades for three years. Site licences to reproduce all instructor guides, student texts and workbooks as well as unlimited rights to access and use PLATO courseware are provided in perpetuity.
Total Hardware and Software Cost	$2,990	$14,927	$9,301	N/A	$8,215
Training	Contact vendor for an estimate of individual training. Small group training is available at price directly below, which is the cost/day. Add expenses to that figure.	Three days training and installation.	Five days of on site training, usually conducted in two sessions. Jostens normally sells standalones in a minimum four-station configuration. It may be possible for a single client to join another client's training session at a cost of $750.		System integration, testing, documentation, three days of staff training on-site and on-going support.
Training Cost	$300	Included in price.	N/A	N/A	Included.
Additional Workstations	As already indicated. Price reductions may be available depending on number purchased.	$7,500	As already indicated. Price reductions may be available depending on number purchased		As already indicated. Price reductions may be available depending on number purchased

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Table B.13

Network Configuration and Costs

	Autoskill	CCC	Jostens	Pathfinder	PLATO
Date	Jan/94	Feb/94	Feb/94	Aug/93	Jan/94
Hardware Server Configuration	IBM/MS-DOS Compatible 286 or higher w/640K RAM, 1.44 MB 3.5" drive, DOS 4.0, mouse, keyboard, 40MB hard drive, color monitor (recommended), network interface card.	IBM/MS-DOS Compatible 486DX or higher (for customers with no budget to upgrade hardware, 386SX will work), Novell Certified w/12MB RAM, 1.44 MB 3.5" drive, DOS 5.0 or better, keyboard, 2GB hard drive (1.2 GB will work), Ethernet network interface card.	IBM 486SX/33 MHz w/8MB RAM, 2.88 MB 3.5" drive, XGA card, DOS 6.0, keyboard, 540MB SCSI hard drive, Mono VGA monitor, SMC 10 Base 2 Ethernet network card.	IBM/MS-DOS Compatible 486SX or higher, Novell Certified w/4MB RAM, 1.44 MB 3.5" drive, DOS 5.0 or better, keyboard, 400MB hard drive, network interface card.	IBM/MS-DOS Compatible 486SX 25 w/32MB RAM, 1.44 MB 3.5" drive, EISA Controller, DOS 6.0, keyboard, 150MB tape backup, mono VGA monitor, 16 bit Ethernet network adapter, Netware 3.12 (25 user) and uninterruptable power supply.
Server Cost	Not applicable. Neither sold nor supported by vendor.	Not applicable. Neither sold nor supported by vendor.	N/A	Not available.	$9,000
Number of Workstations	8	10	10	20	10
Workstations Configuration	IBM/MS-DOS Compatible 286 or higher w/640K RAM, 1.44 MB 3.5" drive, DOS 4.0, mouse, keyboard, 40MB hard drive, color monitor (recommended), network interface card.	Minimum 486SX (386SX will work), w/4MB RAM, 1.44 MB 3.5" drive, 40MB hard drive, 512K video RAM, DOS 5.0 or better, Windows 3.1 or better, mouse, keyboard, SVGA monitor, 16 Bit SMC Ethernet adapter card, Sound Blaster 16 audio & head set.	486SX/25 MHz, w/4MB RAM, 1.44 MB 3.5" drive, DOS 6.0, keyboard, SVGA monitor, 16 Bit SMC Ethernet adapter card, Digispeech adapter & head set.	As Pathfinder is a Computer Managed Learning System that directs students to traditional curricula, eight 286 or higher w/1MB RAM will service 20 students. Also 1.44 MB 3.5" drive, DOS 5.0 or higher, mouse, keyboard, VGA monitor, network interface card.	IBM/MS-DOS Compatible 486SX 25 w/4MB RAM, 1.44 MB 3.5" drive, DOS 6.0, keyboard, SVGA colour monitor, 16 Bit Ethernet network adapter.
Workstations Cost	Not applicable. Neither sold nor supported by vendor.	Not applicable. Neither sold nor supported by vendor.	N/A	N/A	$15,450

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Table B.13 (continued)

	Autoskill	CCC	Jostens	Pathfinder	PLATO
Miscellaneous	The vendor does not sell nor support networking hardware and system software. Courseware can be loaded onto an industry standard network, or run on individual computers.	Novell 2.2 or better networking software, cabling. Tape backup, double speed CD-ROM drive, backup power supply.	Novell Netware 3.11 (20 user), installation and setup, Lexmark 2380 dot matrix printer, backup power supply - American Power Conversion UPS 400W, Wangtech 5525 tape backup, 14,400 modem.	Novell Netware 3.1x (20 user), dot matrix printer, backup power supply, tape backup, 9600 baud modem, cables.	Network printer, server accessory kit, ten workstation resource kit.
Miscellaneous Cost	Not applicable. Neither sold nor supported by vendor.	Not applicable. Neither sold nor supported by vendor.	N/A	N/A	$1,495
Total Cost of Hardware	Not applicable. Vendor sells software only.	Not applicable. Neither sold nor supported by vendor.	N/A	N/A	$25,945
Software	Reading and Math (also sold separately at $7,995 each; French also available at same price).	SuccessMaker Management System, 10-station licences, full ILS package, 3-course ESL site licences and publications package, as well as the following services: training and installation (6 days), annual courseware fee and brokerage fee.	Instructional courseware with three tiers of learning in Reading, Writing and Math. Includes software installation, management and instructional software.	Pathfinder design and delivery management system, and the following courseware: Reading and Writing, Math, Science, Social Studies and Employment Life. Plus Multi-Resource library for above.	Comprehensive Literacy Skills including Basic Skills Math, Reading and Language Arts and Advanced Literacy Skills, Math, Reading, Writing, Science, Social Studies and Computer Awareness as well as Life Coping Skills.
Software Cost	$15,990	$65,865	$44,000	$106,000	$50,050
Remote Access Configuration	Not available.	9600 baud modem recommended. At the moment is not being used for student access.	14,400 modem (host/ remote). Allows vendor to provide support by controlling the computer over the phone line to a remote location. At the moment is not being used for student access.	N/A	N/A
Remote Access Cost	N/A	Not applicable. Neither sold nor supported by vendor.	N/A	N/A	N/A

Table B.13 (continued)

	Autoskill	CCC	Jostens	Pathfinder	PLATO
First Year Support Services & Site Licence	As of January 1994 the support is free.	Included in the first year are Software Maintenance, Hotline Support, Consultant Visit and Services. Second and succeeding years - $4,500.	First year technical support and consumables, five days training (on site), remote diagnostics/ technical assistance, toll-free support and system upgrades - $9,530.	$18,700	$2,250
Total Cost - Exclusive of Hardware	$15,990	$65,865	$53,530	$124,700	Includes hardware - $78,245
Cost per Workstation	$1,999	$6,587	$5,353	$6,235	$7,825
Training	Contact vendor for estimate of training. Small group training is available at price directly below, which is the cost/day. Add expenses to that figure.	Three days initial training, two days 2nd level training and one day new release training.	Five days of on site training, usually conducted in two sessions.	Two days of installation, 5 days of training and first year's support.	System integration, testing, documentation, three days of staff training on-site and ongoing support.
Training Cost	$300	Included in system price.	Included.	Included.	Included.
Annual Software Support and Upgrades	Support is free. No site licence at this time. There may be additional costs for major software upgrades.	$5,828	$4,694	$8,700	Included in the price is toll-free support and software upgrades for three years. Site licences to reproduce all instructor guides, student texts and workbooks as well as unlimited rights to access and use PLATO courseware are provided in perpetuity.
Additional Workstations	Price negotiable depending on number purchased.	Price negotiable depending on number purchased.	$2,200	Price reductions may be available depending on number purchased.	$6,600

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APPENDIX C

INTERVIEW SCHEDULES DEVELOPED FOR THE PROJECT

1. Interview Schedule for Instructors of Integrated Learning Systems
2. Interview Schedule for Students Currently Using an Integrated Learning System
3. Interview Schedule for Students Not Currently Using an Integrated Learning System

Interview Schedule for Instructors of Integrated Learning Systems

A. Background Data

1. Interview date ______________________________

2. Site ______________________________________

3. Type of system

Autoskill	______	PALS	______
CCC	______	PLATO	______
Jostens	______	Pathfinder	______

4. Name of Instructor ______________________

5. Age:

< 25	______	41-55	______
26-40	______	55+	______

6. Level

Fundamental (Adult Basic)	______	Advanced (Adult Gr. 11)	______
Intermediate (Gr. 10 Prep)	______	Provincial (Completion)	______
GED	______		

B. Program Description and Experience

1. What is the educational philosophy/mission of your site?

____

2. Please describe the programs you offer.

   a) What range do you offer students?

   ____

   b) When do you offer them (i.e., your site timetable and schedule)?

   ____

   c) How many students are you responsible for in a class, term, session?

   ____

   d) How many terms or sessions in a year?

   ____

3. Tell us about the learners your program serves.

a) What is the age range?

____

b) What is the average age?

____

c) What sort of backgrounds do they have?

____

4. Tell us about your teaching experience prior to working with this ILS (private, public, college, etc.):

a) What ages had you taught prior to coming to this site?

____

b) Where?

____

c) When?

____

d) and for whom?

____

5. Would you describe yourself as computer literate?

Yes _____ No _____

6. Have you used or taught with other Integrated Learning Systems?

Yes _____ No _____

a) If so, which system(s)?

____

b) where?

____

c) when?

____

d) and for whom?

____

7. How long have you been working with this system?

_____ years ______ months

8. What training programs did you go through before you began working with this ILS?

____

9. Describe how the ILS was introduced (staff and student orientation) to the classroom/learning centre.

____

10. How critical is the ILS to the delivery of your program(s)?

____

11. What do you like the most about your ILS? Please explain.

____

____

12 What do you like the least? Please explain.

____

____

13. What do you see as the advantages and disadvantages of working with Integrated Learning Systems?

____

____

14. Does the ILS need the support of an instructional assistant?

Yes _____ No _____

Why or why not?

____

15. Do you have an instructional assistant?

Yes _____ No _____

If yes, describe numbers, duties, background.

____

____

16. Have you evaluated the ILS in your context?

Yes _____ No _____

If so, please describe the process and the results.

____

____

17. Do you have any special needs students?

Yes _____ No _____

a) If yes, describe how the ILS has supported your efforts with these students

____

b) and/or how it has not.

____

18. Who initially sponsored your ILS? Who currently sponsors the program?

____

19. What advice could you give instructors contemplating working with an ILS?

20. Any comments or questions?

C. Integrated Learning Systems Analysis

Reflect for a few moments on the learning environment you and your students experience with the Integrated Learning System (ILS) at your site. Using these experiences as a guide, respond to the following statements about how you and your learners might interact with the system. For each statement, please circle the number that indicates the way the ILS most frequently responds. Your choices range from one through five according to the following scale:.
instruction

1	*2*	*3*	*4*	*5*
Always	*Very Frequently*	*Often*	*Seldom*	*Never*

1. The ILS requires the active participation of the learner. 1 2 3 4 5
2. The ILS allows for a variety of student learning styles. 1 2 3 4 5
3. The ILS allows students to learn at different rates. 1 2 3 4 5
4. The ILS encourages learning as an individual process. 1 2 3 4 5
5. The ILS encourages learning as a social process. 1 2 3 4 5
6. The ILS provides access to networks and information outside the four walls of the classroom. 1 2 3 4 5
7. The ILS meets many diverse needs. 1 2 3 4 5
8. The ILS provides access to the Internet. 1 2 3 4 5
9. The ILS relieves the instructor and support staff of classroom management responsibilities (e.g., marking, record keeping). 1 2 3 4 5
10. The ILS courseware (curricula) provides Canadian content. 1 2 3 4 5
11. The ILS courseware is culturally sensitive. 1 2 3 4 5
12. The scope of the ILS curricula meets Fundamental level requirements. 1 2 3 4 5
13. The scope of the ILS curricula meets GED requirements. 1 2 3 4 5
14. The scope of the ILS curricula meets Intermediate level requirements. 1 2 3 4 5

1	*2*	*3*	*4*	*5*
Always	*Very Frequently*	*Often*	*Seldom*	*Never*

15. The scope of the ILS curricula meets Advanced (Grade 11) level requirements. 1 2 3 4 5

16. The scope of the ILS curricula meets Provincial (Dogwood) level requirements. 1 2 3 4 5

17. The ILS offers specialized topics outside the core curricula (i.e., keyboarding, computer literacy and applications). 1 2 3 4 5

18. The ILS offers competency-based curriculum design (i.e., pre-testing, tutorial, practice/application, posttesting). 1 2 3 4 5

19. The ILS uses off-line materials (i.e., textbooks and other print material) as essential complements to on-line materials. 1 2 3 4 5

20. The ILS uses off-line materials as supplements or reinforcements to on-line materials. 1 2 3 4 5

21. The ILS allows instructors to integrate their own curricula with that of the system. 1 2 3 4 5

22. The ILS makes appropriate use, for adults, of graphics, sound and colour. 1 2 3 4 5

23. The ILS hardware is reliable (i.e., computers, monitors, printers, etc.). 1 2 3 4 5

24. The ILS software is reliable (i.e., the system software operates as it was intended and does not cause system "hang-ups"). 1 2 3 4 5

25. The ILS courseware/curricula is reliable (i.e., the information presented is free of errors). 1 2 3 4 5

26. The ILS curriculum is composed of modules that may be assigned according to student need. 1 2 3 4 5

27. The ILS provides a variety of instructional strategies (e.g., tutorial, application, simulation, drill, etc.). 1 2 3 4 5

28. The ILS allows learners to control the time they spend on task (i.e., the time is tracked but not controlled). 1 2 3 4 5

1	*2*	*3*	*4*	*5*
Always	*Very Frequently*	*Often*	*Seldom*	*Never*

29. The ILS allows students choice of topics and activities. 1 2 3 4 5

30. The ILS allows instructors to use courseware from other vendors and sources. 1 2 3 4 5

31. The ILS allows instructors to author curriculum (i.e., create, omit, exempt, rearrange, augment). 1 2 3 4 5

32. The ILS provides instructors with reports on curricula and on student progress. 1 2 3 4 5

33. The ILS allows instructors to develop customized reports on curricula and student progress. 1 2 3 4 5

34. The ILS allows instructors to easily export data to other database software applications (e.g., dBase, Paradox Foxpro). 1 2 3 4 5

35. The ILS is simple for students to use. 1 2 3 4 5

36. The ILS is simple for instructors to use. 1 2 3 4 5

37. The ILS provides adequate security (i.e., unauthorized users are not able to manipulate data and information). 1 2 3 4 5

38. The ILS allows for bookmarking (i.e. a student can easily return to a previous day's lesson). 1 2 3 4 5

39. The ILS developer has arranged for good local hardware maintenance support. 1 2 3 4 5

40. The ILS developer offers helpful toll free support for its courseware. 1 2 3 4 5

41. The ILS developer offered effective initial training. 1 2 3 4 5

42.. The ILS developer offers useful ongoing training. 1 2 3 4 5

43. The ILS provides easy to use tape back-up capability. 1 2 3 4 5

1	***2***	***3***	***4***	***5***
Always	***Very Frequently***	***Often***	***Seldom***	***Never***

44. The ILS allows you to easily integrate other LAN applications with its own program. 1 2 3 4 5

45. The ILS allows students to easily access the system by modem (i.e., a user can dial in from a home computer). 1 2 3 4 5

46. The ILS developer offers educational expertise and experience beyond sales and technical to support program design and implementation. 1 2 3 4 5

47. The ILS developer provides informative newsletters. 1 2 3 4 5

48. The ILS developer offers a viable users group network. (i.e., contacts with other system users) 1 2 3 4 5

49. The ILS developer provides helpful company sponsored support activities (e.g., workshops, conferences). 1 2 3 4 5

50. The ILS developer provides impartial product reviews and performance references for their system. 1 2 3 4 5

Interview Schedule for Students Currently Using an Integrated Learning System

A. Background Data

1. Interview date ______________________

2. Site ____

3. Type of system

Autoskill	______	PALS	______
CCC	______	PLATO	______
Jostens	______	Pathfinder	______

4. Student Name ____

Male	____	Female	______

5. Age group:

18-25	_____	41-55	_____
26-40	_____	55+	_____

6. Level

Fundamental (Adult Basic)	_____	Advanced (Adult Gr. 11)	_____
Intermediate (Gr. 10 Prep)	_____	Provincial (Completion)	_____
GED	_____		

B. Program Description and Experience

1. How long have you been working on this computer system?

____

2. How much time do you spend on the computer in the classroom/learning centre (days/week, hours/day):

a) getting tests and assigments? ____days ____hours

b) doing computer lessons, assignments or tests? ____days ____hours

3. Do you use the computer for:

a) word processing? No _____ If yes, ____days ____hours

b) electronic communication (e.g., email) with other students/instructors?
No _____ If yes, ____days ____hours

c) other computer applications (e.g. spreadsheets, keyboarding)?
No _____ If yes, ____days ____hours

4. How much time per week do you spend in the classroom/learning centre on activities such as:

a) group work with other students? ____days ____hours
b) one-on-one with the instructor? ____days ____hours
c) instructor's lectures to class? ____days ____hours
d) working on your own ____days ____hours

5. Do you have access to a computer outside school/this program?

a) If no, ___
Would you like to have one to work on your lessons at home?
Yes ____ No ___
Why not?

____

b) If yes, __
Do you use the computer to work on your lessons/studies at home?
Yes ____ No ___
How much time? ____days ____hours
For what activities?

____

6. Have you attended other adult learning programs or classes (or been tutored) before coming to this program with its computer system?
Yes ____ No ___
If yes, describe the last program you attended (type - college, SD, Community, other, level, length, schedule, etc.)

____
____
____

7. What would you say are the main differences between this computer-based program and the other adult programs you attended?

____
____
____

8. Which computer-based subjects do you like:

a) the best? _____________
b) the least? _____________

9. Circle your answer: *M = More time* *L = Less time* *S = Same Amount*

a). How much time would you like to spend on the computer each day (week)? M L S

b) How much time would you like to spend on non-computer activities? M L S

c) How much time would you like the instructor to spend with you? M L S

10. If you were involved in this kind of learning again,

a) is there anything you would like to see changed? Yes ____ No ____
If yes, please explain.
____

b) are there any course additions you would like? Yes ____ No ____
If yes, please explain.
____

11. Are there any parts of the computer system (name) that you found frustrating? Yes ____ No ____
If yes, please explain.
____

12. Do you feel you are a better reader now? Yes ____ No ____
If yes, how are you better?
____

13. Do you feel you are a better writer now? Yes ____ No ____
If yes, how are you better?
____

14. Do you feel you are better in math now? Yes ____ No ____
If yes, how are you better?
____

15. Do you feel you are a better learner now? (Study skills) Yes ____ No ____
If yes, how are you better?
____

16. Are there any other content or skill areas in which you feel you are better?

Yes ____ No ___

If yes, how are you better?

____

17. Compared to other adult upgrading programs, do you feel that this adult program with its use of a computer system is:

(a) better b) worse (c) about the same

18. Would you recommend this computer system to others who have similar backgrounds to your own?

Yes ____ No____

Comments

____

____

____

C. Response to Computer Learning

Think carefully about each of the following statements and then give your answer using the following ratings:

SA	***A***	***D***	***SD***	***DK***
Strongly Agree	***Agree***	***Disagree***	***Strongly Disagree***	***Don't Know***

1. Using the computer for learning made me nervous when I started. SA A D SD DK
2. Using the computer for learning is easy. SA A D SD DK
3. Using the computer for learning allows me to learn at my own pace. SA A D SD DK
4. Using the computer for learning encourages me to work with others. SA A D SD DK
5. Using the computer for learning is slower than other learning methods. SA A D SD DK

SA	***A***	***D***	***SD***	***DK***
Strongly Agree	***Agree***	***Disagree***	***Strongly Disagree***	***Don't Know***

6. Using the computer for learning provides greater variety in learning activities than other adult learning programs I have attended. SA A D SD DK

7. Using the computer for learning is an efficient use of my time. SA A D SD DK

8. Using the computer for learning increases my interest in subjects more than other learning methods. SA A D SD DK

9. Using the computer for learning means I get the instructor's help when I need it. SA A D SD DK

10. Using the computer for learning allows me to work with materials relevant to my needs. SA A D SD DK

11. Using the computer for learning has made me want to learn more. SA A D SD DK

12. Using the computer for learning has made me a more confident learner. SA A D SD DK

13. Using the computer for learning means most of my time in class is spent working on the computer. SA A D SD DK

14. Using the computer for learning means I feel I can use computers in my everyday life. SA A D SD DK

Interview Schedule for Students
Not Currently Using an Integrated Learning System

A. Background Data

1. Interview date ____________________

2. Site ____

3. Type of system

	Autoskill	______	PALS	______
	CCC	______	PLATO	______
	Jostens	______	Pathfinder	______

4. Student Name ____________________________________

Male	_____	Female	______

5. Age group:

18-25	______	41-55	______
26-40	______	55+	______

6. Level

Fundamental (Adult Basic)	______	Advanced (Adult Gr. 11)	______
Intermediate (Gr. 10 Prep)	______	Provincial (Completion)	______
GED	______		

B. Program Description

1. How long did you work on this computer system?

____

2. How much time did you spend on the computer in the classroom/learning centre (days/week, hours/day):

   a) getting tests and assigments? ____days ____hours

   b) doing computer lessons, assignments or tests? ____days ____hours

3. Did you use the computer for:
   a) word processing? No _____ If yes, ____days ____hours

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b) electronic communication (e.g., email) with other students/instructors?
No _____ If yes, ____days ____hours

c) other computer applications (e.g. spreadsheets, keyboarding)?
No _____ If yes, ____days ____hours

4. How much time per week did you spend in the classroom/learning centre on activities such as:

a) group work with other students? ____days ____hours
b) one-on-one with the instructor? ____days ____hours
c) instructor's lectures to class? ____days ____hours
d) working on your own ____days ____hours

5. Did you have access to a computer outside school/this program?

a) If no, ___
Would you have wanted one to work on your lessons at home?
Yes ____ No ___
Why not?

____

b) If yes, __
Did you then or do you now use the computer to work on your studies at home?
Yes ____ No ___
How much time? ____days ____hours
For what activities?

____

6. Had you attended other adult learning programs or classes (or been tutored) before coming to the program with this computer system?
Yes ____ No ___
If yes, describe the previous program you attended (type - college, SD, Community, other, level, length, schedule, etc.)

____
____

7. What would you say were the main differences between the computer-based program and the other adult programs you attended?

____
____

8. Which computer-based subjects did you like:

a) the best? _____________
b) the least? _____________

9. Circle your answer: ***M = More time*** ***L = Less time*** ***S = Same Amount***

a). How much time would you have liked to spend on the computer each day (week)? M L S

b) How much time would you have liked to spend on non-computer activities? M L S

c) How much time would you have liked the instructor to spend with you? M L S

10. If you were involved in this kind of learning again,

a) is there anything you would like to see changed? Yes ____ No ___
If yes, please explain.

b) are there any course additions you would like? Yes ____ No ___
If yes, please explain.

11. Were there any parts of the computer system (name) that you found frustrating? Yes ____ No ___
If yes, please explain.

12. Do you feel the computer system helped you become a better reader? Yes ____ No ___
If yes, how are you better?

13. Do you feel the computer system helped you become a better writer? Yes ____ No ___
If yes, how are you better?

14. Do you feel the computer system helped you become better in math? Yes ____ No ___
If yes, how are you better?

15. Do you feel the computer system helped you become a better learner? Yes ____ No ___
If yes, how are you better?

16. Are there any other content or skill areas in which you feel the computer system helped you become better?

Yes ____ No ___

If yes, how are you better?

____

17. Compared to other adult upgrading programs, did you feel that the adult program with its use of a computer system was:

(a) better b) worse (c) about the same

18. Would you recommend this computer system to others who have similar backgrounds to your own?

Yes ____ No____

19. Compared to the adult program with its use of a computer system:

a) what do you like about your present program?

____

b) what do you dislike about your present program?

____

Comments

____

____

____

C. Response to Computer Learning

Think carefully about each of the following statements and then give your answer using the following ratings:.

SA	***A***	***D***	***SD***	***DK***
Strongly Agree	***Agree***	***Disagree***	***Strongly Disagree***	***Don't Know***

1. Using the computer for learning made me nervous when I started. SA A D SD DK

2. Using the computer for learning was easy. SA A D SD DK

SA	*A*	*D*	*SD*	*DK*
Strongly Agree	*Agree*	*Disagree*	*Strongly Disagree*	*Don't Know*

3. Using the computer for learning allowed me to learn at my own pace. SA A D SD DK

4. Using the computer for learning encouraged me to work with others. SA A D SD DK

5. Using the computer for learning was slower than other learning methods. SA A D SD DK

6. Using the computer for learning provided greater variety in learning activities than other adult learning programs I have attended. SA A D SD DK

7. Using the computer for learning was an efficient use of my time. SA A D SD DK

8. Using the computer for learning increased my interest in subjects more than other learning methods. SA A D SD DK

9. Using the computer for learning meant I got the instructor's help when I needed it. SA A D SD DK

10. Using the computer for learning allowed me to work with materials relevant to my needs. SA A D SD DK

11. Using the computer for learning made me want to learn more. SA A D SD DK

12. Using the computer for learning made me a more confident learner. SA A D SD DK

13. Using the computer for learning meant most of my time in class was spent working on the computer. SA A D SD DK

14. Using the computer for learning meant I felt I could use computers in my everyday life. SA A D SD DK